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Analyses of Occupational Illnesses and Implementation of Preventive Strategies at Connecticut Tobacco Farms

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Analyses of Occupational Illnesses and Implementation of Preventive Strategies at Connecticut Tobacco Farms

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Abstract

Background: Farming is one of the most dangerous occupations in the United States and the Migrant Farm Workers (MFW) have increased levels of work-related illnesses compared to other groups of workers in the United States. Their knowledge and attitudes about chemical, biological and physical exposures are not well known, suggesting that they may not be aware of the risks they experience in the fields. Educational posters, if designed based on documented knowledge deficits, may serve as a method to lessen adverse outcomes. The **purpose** of this study was to identify workers' knowledge and behavioral gaps in two arenas of common occupational exposures: heat and pesticide exposure. **Methods**: A compilation of observation, focus groups, and physician dataset analyses was used to identify issues facing the MFW's population in Connecticut. The impact of educational posters on MFW's knowledge in prevention of heat and pesticide exposures and reported behaviors were identified and analyzed at tobacco farms with pre and post surveys. **Results:** The heat prevention educational poster created a statistically significant improvement in knowledge without changes in reported behaviors. No significant changes were seen with the pesticide prevention educational poster. Behaviors correlated with knowledge and access to personal protective equipment. **Conclusions:** More research is needed to assess the role of educational and behavioral interventions on MFW's health outcomes. Access to personal protective equipment is an important factor in promoting changes in protective behaviors related to heat and pesticides exposures.

"We used to own our slaves; now we just rent them"
–Southern Farmer, Harvest of Shame 1962

Introduction and Historical Background:

With the abolition of slavery, laborers were needed to tend to the fields of large farms throughout the United States (US). These laborers, in need of work, came from within and outside of US borders, often being of lower economic status. While not property of the growers, in some characteristics their situation was worse than that of slaves. Work requirements, housing, and other resources provided remained the same; however, security did not. At times of high worker supply or a poor economy, their wages were lowered significantly and many were laid off. In addition, due to the seasonal nature of crops, the demand for workers shifted locations throughout the year, forcing a migratory pattern.[30]

These adverse characteristics were especially evident during the economic downturn of the Great Depression, resulting in many worker strikes and the formation of unions.[30] Although initially successful, as with uprisings from other small minority groups against financial powers, these actions ultimately failed. Growers effectively counter-attacked by trying to disrupt worker attempts to unionize as well as through legislative tactics leaving the most vulnerable and least organized workers, the foreign born, unprotected. National awareness and attempts to improve the plight of this population did not begin until the 1960's. Through legislation, worker protection safety guidelines, enforcement, and interest of 3rd party organizations the working and living conditions have improved. However, they still remain some of the worst in the US, with resultant adverse health outcomes.[53]

While the balance of power between laborer and grower interests varied throughout history, the growers' interests have consistently triumphed over the needs of workers, impacting workers' health and safety. When labor supply decreased, legislation was passed to protect growers with a resulting power struggle between the U.S. Department of Agriculture (pro-growers) and the US Department of Labor (pro-workers) during the 1930's.[53] Agricultural interests successfully lobbied to exclude farm workers from the Fair Labor Standards Act of 1938, which for other employment groups established minimum wage, guaranteed overtime pay, and prohibited child labor.[2] In addition, due to a domestic shortage of workers during World War II, emergency legislation allowed the Bracero Program to be established in 1943, which led to the importation of Mexican workers.[30] This bi-national agreement was pivotal to the discussion of migrant farm worker issues. The additional laborers greatly decreased the earning potential of domestic farm workers, a situation further exacerbated by the new ability of growers to control wages in 1947.[50] This wage lowering strategy was recognized by advocacy groups and in 1964 the Bracero Program was eliminated.[30] However, the H2A program, where workers from the West Indies and Mexico receive temporary visas to labor in the Unites States, served as a replacement and continues predominantly on the East Coast. Currently, employers gain approval from the Department of Labor to hire approximately 45,000 seasonal guest workers per year under this program. Growers participating in the H-2A program are required to comply with all federal and state labor-related laws, pay a special minimum wage that is set at the average regional wage earned by MFW, furnish their workers with free housing that meets the temporary labor camp standards prescribed by OSHA, provide workers' compensation for job-related injuries and illnesses, and reimburse

workers for the cost of transportation from their home country to the place of employment and back (upon completion of a specified portion of the work contract).[1]

After failed attempts at passage of legislation to assist farm workers, the strategy changed to focusing on providing federally mandated services. The Migrant Health Act of 1962, signed by President Kennedy, provided grants to states, local governments, and non-profit agencies for clinics and other health services under the guidance of the Department of Health and Human Services (DHHS). Signed into law in 1964 by President Johnson, Migrant Education and Migrant Head Start programs were created. These acts are the backbone of Migrant Health Policy today.

In respect to health in the work environment, several key legislations have been passed including Occupational Safety and Health Act's (OSHA) Field Sanitation Standard which requires the provision of toilets, potable water, and handwashing facilities to workers in the field,[37] the Worker Protection Standard (WPS) under the Environmental Protection Agency (EPA) which requires visibly placed pesticide notices, warnings, safety training, and personal protective equipment (PPE),[44] and the Migrant and Seasonal Agricultural Worker Protection Act (MSPA) in which housing and transportation must meet safety and health standards.[4] However, loop holes exist, with farms with less than 10 workers exempt from OSHA regulation,[44]and enforcement is poor, with only 7.6% of pesticide violations in a 10 year period in Florida resulting in fines.[47]

A component of the Immigration Reform and Control Act of 1986, the special agricultural legalization program, was intended to legalize approximately 350,000 farm workers in order to lessen concerns about worker shortage due to planned increases in

border enforcement. There were 1.3 million applications and legalizations performed as a result, and many of these individuals permanently settled in the US. This "settling in" of these formerly migrant populations created community networks here in the US, which have been implicated in further increasing immigration. It has been suggested that increased border surveillance in addition increases the likelihood of undocumented workers remaining in the US indefinitely due to increased difficulties in leaving and re-entering the US.[31]

With failed immigration control and surges of migration, migrant workers are increasingly being viewed by the public less as a minority population and more as undocumented immigrants. There are concerns that migrants are collecting social benefits and taking away jobs from domestic workers. They are regarded as deviant and dependents, which contribute to a decrease in public support for immigrant populations, allow poor regulatory practices to create unsafe working and living environments, and make the workers hesitant to report practice violations. Violence against undocumented migrant workers is another problem that is increasing since without documentation these workers will not access public safety officials when victimized.[8, 26, 34]

With the barriers mentioned above, especially social isolation and political opposition, the migrant farmworker population represents a logical focus for the development and implementation of interventions to improve occupational safety and health. As a public health student, it is clear to me that there are large gaps in the infrastructure for protecting these farmworkers. Although there are currently some programs for assisting the population many are inaccessible to the workers for the

reasons mentioned above, making the development of self-efficacy and disease and injury prevention programs paramount.

"Education costs money, but then so does ignorance." ~~ Claus Moser

Reasons for this Research

On initial observation one might wonder, "Why should we worry about this population?" They are mostly young and healthy, often playing or socializing after work ends. Many say they are "strong," never sick, and unconcerned about becoming ill. Their housing could be considered poor but is equivalent to that of many overnight summer camps where United States children are sent for short-term vacation. They are fed and receive paychecks for their work. Room and board are discounted and taken directly from their paycheck. OSHA and EPA regulations provide limited protections to MFW.

However, the adverse social determinants of health--crowded housing, work conditions without proper training or protection, lack or deficient means of transportation, limited sanitary facilities while in the fields, limited water supply frequently without soap or towels in the fields--make additional resources and strategies necessary for improving MFW's health. In any discussion of migrant worker health, the following factors need to be considered:

1. Healthy worker effect: Workers are selected yearly for positions on farms. Those that are ill therefore will not be chosen, thereby "weeding out" the weaker or "unlucky."
2. Lack of support: If their health fails they are isolated. Family, other loved ones, and support networks are left behind in their state or country of origin. There is no social security or disability. Even in areas where support agencies are available, workers frequently are not aware of them or fear reprisal when

using services. Additionally, many support agencies have operations from 9 AM to 5 PM during which the workers are required to be in the fields.

3. Chronic illness: Cancer and long-term work related disease and disability require time to occur (latency) and the connection between work and illness may be difficult to establish. Migrant workers have difficulty recreating their working patterns to document exposures for diseases with long latency periods such as cancer.
4. Limited scope of social support programs: Although the support programs (see appendix A) greatly improve the quality of life of those using them, many workers are excluded based on predetermined definitions of MFW and the limited resources of the programs. For example, while the Job Partnership Training Act programs provide better jobs for individually qualified workers, the large pool of available workers means that the individual getting a better job is soon replaced by another equally poorly qualified worker, resulting in no significant change in the MFW's demographics. Another issue is that migrant health centers, though providing a source of care for MFW, usually have hours of operation only during the day, creating a conflict between financial incentives to work and the need for medical attention for acute and chronic conditions.
5. Limited and insecure funding of social support programs: Infrastructure needs including staffing and maintaining offices, developing and maintaining technology and training, updating and printing materials, piloting courses, and participating in the certification processes makes these programs expensive.

> As funding is predominantly derived from federal and state short-term categorical grants, problems arise including frequent shifts in focus based on available grants (not necessarily correlating with observed needs), changes in job security, and low wages.[45]

Due to these factors, evaluation of the migrant farm worker population's health status is difficult and underreporting of morbidities is likely.

Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime. –Lao Tzu

Background and Literature Review:

Members of the farm-working population in the United States are increasingly migratory, foreign born, and undocumented, with the largest population of these workers being Latino. Despite our society's great reliance on farmworkers work in this hazardous field, their median yearly income is less than $7,500,[19] job security is poor,[12, 19] and they often lack health insurance. To exacerbate the situation, on average they have only completed six years of education, have limited English proficiency, are culturally segregated, and often functionally illiterate in Spanish as well.[51] These characteristics, along with their immigration status, deter many from seeking healthcare. MFW face numerous hazards as a result of their occupational environment and living situations. They have a high incidence of illnesses including: chemical and pesticide related illnesses, dermatitis, heat stress, respiratory conditions, musculoskeletal disorders, and cancer as elicited through focus groups and population studies.[21, 25] MFW's labor and live in environments that increase their incidence of illness and injury. Not only are they exposed to extreme weather conditions (heat, cold, rain, sun) but are also in direct contact with plants, chemicals, and dusts which combined can lead to serious health problems such as rashes, tearing eyes, blurred vision, neuropathy, heat exhaustion, headache, nausea, and more.[21] Additionally, illnesses may result from direct pesticide spraying of workers, indirect pesticide spray contact from wind drifts, direct dermal contact from crops, bathing in or drinking contaminated water, or failure to adequately clean ones hands after working in the fields.[25] The weather conditions combined with pesticide

exposure act symbiotically, as warm skin increases dermal pesticide absorption.[24] Unfortunately, without prior priming and education, the etiology of the symptoms may not be identified and no intervention performed. Although illnesses rates secondary to environmental and pesticide exposure is unknown, in total it is estimated that approximately 300,000 MFW suffer from occupational illnesses per year—comprising the highest rate of injuries/illnesses of any work group in the US.[25] Based on Bureau of Labor Statistics data from 2007 estimate that 6.3 farmworkers per 100 suffer non-fatal injuries and 27.3 per 100,000 suffer fatalities yearly.[48, 49]

In addition to the MFW's living environment, their daily work requirements increase their chance of developing infirmity. They have little control over their working conditions, and can be told to reenter fields that are still wet with pesticide (before the required reentry interval has elapsed). Because OSHA regulations are not strictly enforced, work activities can continue without appropriate intervals or periods for rest, access to drinking water, soap, and towels for washing or drinking water.[52] Despite the well documented increase risk for illness in the farm environment, the underlying etiology is not completely understood but likely includes lack of knowledge and risky behaviors by the MFW as critical exacerbating factors.

Studies have been conducted to evaluate the etiology of increased levels of illness in this population as well as propose solutions.[41] These studies have collected injury data, identified health care resources, and proposed solutions to minimize injuries. The literature indicates a need to reduce exposures through change of living conditions, working practices, and use of safety equipment, especially personal protective equipment (PPE) (both proper utilization of and access to).[21, 52] Studies suggest that proper PPE use

would lessen adverse exposures, producing better overall health outcomes. However, MFW are sometimes responsible for supplying their own PPE, which they cannot readily afford and/or purchase. Moreover, they may not be aware of the potential exposure hazards, or may not fear the risk enough to value protective measures.[21, 41]

Lack of knowledge about exposures by both MFW and farm growers (owners/supervisors) is a main finding from several studies.[9, 21, 25, 28, 41] Through focus groups and in depth interviews, MFW expressed concern about adverse conditions, but their beliefs about the exposures and their risk factors do not correlate with scientific evidence,[41] thus suggesting that they may not be aware of or underestimate the risks they experience. According to the OSHA standards, the MFW are supposed to receive training for protection against exposures and injuries, but reportedly the farm owners do not always inform the workers of these hazards, nor provide mandated trainings because they do not themselves regard the exposures to be of high risk.[28] Thus the lack of understanding in the MFW population is further compounded by the lack of knowledge of farm-owners/growers, who overlook safety requirements, at times obliging workers to reenter wet fields and/or work with inadequate breaks, thus exposing MFW to occupational hazards based on their own ignorance.[41] The ignorance may result in inadequate hydration and lack of worker hand washing in the fields, both of which have simple, inexpensive solutions. Not only are health and safety sacrificed, but also productivity.

Although not yet effectively demonstrated by any study, proper education and other health interventions for MFW could reduce misconceptions about hazardous conditions and consequently result in a reduction of their occupational injuries and

illnesses. Based on the belief in interventional efficacy, many studies aim to understand and provide the best techniques to educate this population—specifically encouraging the use of safe practices and PPE. Nearly all studies support the use of skilled outreach worker--experienced, bilingual, and bicultural--to interact with the workers.[21, 23, 25, 41, 46] Some outreach worker directly trains all the MFW, while others train a small subset of workers who in turn train the remainder of the MFW; each approach has its inherent strengths and weaknesses.

Because of the high turnover rate in the population (~25% new workers yearly), this costly training must occur annually. Liebman and colleagues reported that the promotoras had a significant dropout rate, were expensive, and provided predominantly one-on-one education.[29] Connecticut does not have the resources or allocated support structure for such in depth educational programs which will compete with funding for other needed resources. Furthermore, as seen from the strong research emphasis on outreach worker educational methods, the current paradigm assumes that health outcomes are improved predominantly by increasing the MFW's knowledge, thereby indirectly altering their attitudes and behaviors. Even assuming this paradigm to be true, with high yearly turnover rates, educational intervention strategies would have to be repeated yearly and rely on annual availability of resources for effectiveness. Failure of the current system is evident in that even basic mandated health safety education is not consistently provided to MFW.[14] Based on current research, it appears that in regions lacking ongoing worker education programs, MFW's knowledge deficits are unaddressed. Where deficits are addressed, there is little evidence to support that knowledge is

translated into behavior. Where education programs do exist, yearly haphazard funding cuts have devastating effects on program integrity and continuity.

While not ideal in a low literacy population, stand-alone posters, if created properly, could potentially be cost effective means for educating and fostering MFW's behavioral change because the need for yearly availability of resources would not be required.[22] Posters can serve effectively as interventional methods for training.[23] Although not as effective in eliciting change as a booklet (novella or pamphlet), posters have been shown to be more effective than viewed television segments and equally effective as provider advice in eliciting change.[23] Moreover, they were the most utilized interventional resources probably due to their availability and clear visibility,[23] serving as a constant reminder of the nature of occupational risk and potential strategies to ameliorate that risk.

Careful focus on the style and content of the posters is vital for having an impact on the MFW's population, especially because behavior change is unlikely without perceived risk. In the absence of priming for perceived risk, people generally report their own risk of experiencing health problems to be less than that of the average person;[43] the likelihood is even greater within the "macho" culture of the MFW. As the posters are about health promotion, evidence suggests they should be in a gain-frame format[43] and primarily should contain self interest messages followed by messages of personal responsibility.[18] Colors and aesthetics as well as setup of the posters, especially the use of photos and imagery, also play a role in the likelihood of being read.[5, 22]

Current research focuses heavily on costly annual interventions that have not been evaluated for behavioral change and do not apply to Connecticut and other regions where

adequate funding is not available. As such, no studies to date have been performed evaluating less resource intensive, more feasible methodologies. Work area implementation of properly designed posters, a low resource requiring intervention, may elicit increased health related knowledge, change behavior, and decrease illness in the MFW's population. To determine the intervention effectiveness of educational posters, this study relied on self report surveys, observation, and analysis of a primary care medical provider encounters database.[32]

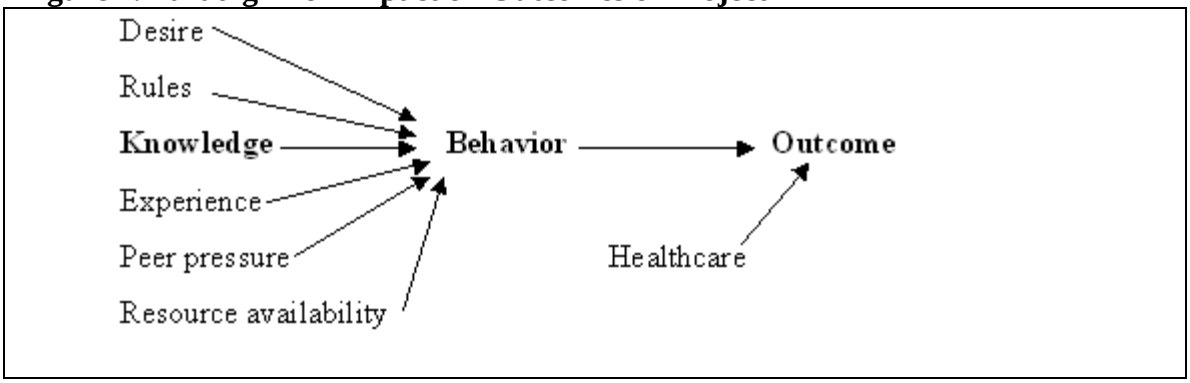
"When the man who feeds the world by toiling in the fields is himself deprived of the basic rights of feeding, sheltering and caring for his own family, the whole community of man is sick." –Cesar Chavez, co-founded of United Farm Workers

Methods:

Overview

The idea of this project came from the paradigm governing behavior changes, which may have an impact in health outcomes. Figure 1 illustrates how knowledge and other psychosocial factors may affect behavior.

Figure 1. Paradigm for Impact on Outcomes of Project



The project can be divided into two summers as shown by the schematic in figure 2. The role of the first summer was to corroborate issues identified in the literature with the status of MFW in Connecticut and to identify predominant health concerns and gaps in their knowledge. After evaluations in focus groups and observations performed in the first summer, the survey templates (appendix B-F) were adjusted, culminating with the primary survey. In the second summer, the poster interventions were created, implemented, and evaluated based on findings from the first summer.

This research protocol was approved by the University of Connecticut Institutional Review Board (IRB). Forms, surveys and training materials were professionally translated into Spanish, adapted to a fourth grade reading level, and also approved by the IRB.

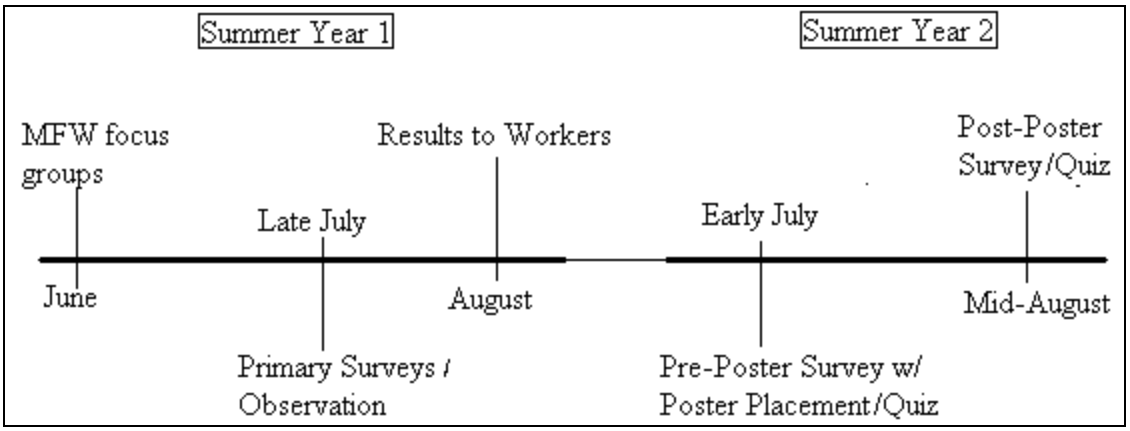
Physician Encounters Data Analysis

Mass League data, which is a collection of all health care visits covered under funding for migrant and seasonal farmworkers in the Connecticut River Valley Region, from 2000-2005 including parameters of date, ICD-9 diagnosis, farm, and service location was obtained. ICD-9 codes were sub-grouped and grouped into categories describing the reason behind the healthcare visit to simplify analysis. As the program is supported by federal and other organizations' support, these data were collected for evaluating the use of the funding and ensuring appropriate allotment. The data then were analyzed for differences using Chi square and trend analysis, comparing farms' utilization of medical services, months when visits occurred, years of the medical encounters, and service locations. Not all variables were available for every year. For the purpose of this thesis, all patient identifiers were removed, including name, home address, social security number, and date of birth. The data from UCONN Farmworkers' Clinic and from one individual farm were compared with all data from the Mass League database. The purpose of this analysis was to identify possible work related diagnoses unmentioned in the literature or focus groups, compare demographics to the of the survey for generalization purposes, and to identify variations in diagnoses by demographic data. Work-related diagnoses were assigned by comparing the percentage of diagnoses occurring during months of highest farming activity (from June to October) to the others and by using rationalization.

Timeline

Figure 2 displays the timeline of this project that was implemented over two summers, from early summer to early fall.

Figure 2. Timeline of Project



Observations

A general observation was performed in the evening, from immediately after work ended until several hours later at the workers' living quarters. Health habits observed for evaluation were showering, hand washing, use of clean clothes, and an estimation use of protective gear while at work based on equipment carried when returning from the fields. The storing of clothes and boots were evaluated quantitatively by inspecting the workers' living quarters. Only those clearly located were noted.

Focus Groups

Focus groups were held to obtain a better understanding of the MFW's environment, knowledge, and behaviors. They took place outside at the farm after work hours in a neutral area. MFW were informed of the focus groups one to two weeks earlier during informal meetings during the UCONN Farmworkers' Clinic. Snacks and drinks were provided as incentives. Attendance was voluntary and no specific method was used for recruiting workers. The goal was to have between 8-16 workers at each

focus group. Focus groups initially began with a structured format with set rules and questions but were adjusted due to paucity of response and unforeseen topics. Each focus group lasted approximately one hour. Questions used at the first focus group targeted verification of stereotypes about beliefs and health habits identified in the literature. The following focus group, performed four weeks after the first, focused primarily on follow-up questions based on observations and preparation for the surveys including identification of images to be used in pictorials. Groups were audio recorded and notes were taken. (See addendum for the questions asked.)

Primary Survey (Appendix G)

Individual surveys with quizzes were conducted at a large tobacco farm to establish general demographic information and evaluate the workers' understanding of heat stress, athlete's foot, dental care, and personal hygiene. These four health issues were chosen based on the focus groups, Mass League data, and observations. The goal was to identify the MFW's ability to extract health facts from pictorials. Surveys included questions on demographics, farmworkers' experience, past training, and reported behaviors. This was a convenience sample survey and all were invited to complete it. The only eligibility criterion for survey completion was being a worker at the farm. The surveys were administered one-on-one by medical students conversational in Spanish. All images used to compose the pictorials in the survey were presented to the workers in a prior focus group to verify appropriate interpretation. Due to assumption of limited literacy, pictorials (see Appendix H) contained few words and were supplied in black and white on standard sized paper. The workers receiving pictorials with the surveys were allowed to review the pictorials while answering the questions. Scoring

was performed blindly by the investigator with one point given for each correct answer. Upon completion, the results of the survey were presented to the workers during English lessons and other social interactions.

Study Survey Methods

Interview data from four tobacco farms was obtained with the total expected sample size ranging from 80-400. This was intended to be a convenience sample so that all working willing were allowed to participate. Initial intention was to use four Spanish speaking farms but demographics changed such that Jamaican farms were used as well. The MFW were provided with information about the study and the survey form prior to administration. They could fill out forms on their own, with assistance of interviewers, or with assistance of a pre-recorded version of the survey. Interviewers were medical students fluent in the Spanish. All interviewers administering the questionnaire were familiar with procedures of confidentiality and human subjects' rights and read directly from the surveys without alteration of words. Surveys were performed outside of the workers' barracks. All surveys at a given farm were completed on the same day to avoid discussion of answers among the respondents. Posters (either modules on heat exposure or pesticide exposure) were placed in a clear location in the barracks after the surveys have been completed. Workers were not informed about the posters' placement. Three to six weeks later, a follow-up survey was conducted with identical questions except that a portion of the initial survey demographics was deleted. As participants were not identified in the pre-poster survey, the follow-up survey was distributed as a convenience sample as well.

Study Survey Creation (Appendix I)

The format of questions in the survey was adapted from a qualitative Aday[6] study and a Las Familias survey,[7] which were created in the open-interview style with a pretest-posttest design to document knowledge and practices of MFW's households in regard to pesticide safety. The Las Familias survey had been used previously with farm workers so its questions were adapted for quantitative analysis. Surveys were provided in the native language of the MFW. The more open-ended primary survey was previously performed in July 2006.[13] Based upon analysis of the primary survey, a three-tiered questionnaire style consisting of demographics, opinion/behavior, and knowledge/quiz questions was developed. The demographics and opinion/behavior questions were adapted predominately from the results of the primary survey. The topics of the quiz questions, on heat and pesticide exposure, were based on the findings of need in the primary survey, expressed interest of some workers, and ample literature on these two problems. Other topics could have been chosen under similar rational. The Mass League data analysis was not included in the decision to choose heat and pesticide exposure/prevention topics due to the difficulty of correlating medical diagnoses based on symptoms with the illnesses. The actual questions were adapted from several sources which have been previously used with the MFW's population.[10, 11, 15-17, 20, 27, 35, 38-40] There were no questions overlapped from the prior survey. These sources were used for the creation of the poster as well.

*Posters' Design (*Appendix K and L*)*

The posters were designed to include material to assist in answering the relevant survey questions yet also to be as compact as possible. Secondary to a higher than expected literacy rate among workers, words were included although images were used in a basic novella style. Prior posters and pamphlets from the literature were reviewed. [10, 11, 15-17, 20, 27, 35, 38-40] Due to the nature of the information, multiple formats including factual, gain and loss frame, were used in the posters. Negative frame was felt to be necessary for the ability to identify afflictions with the conditions. As faces are more attractive than images alone, photos of facial expressions were obtained from medical students to emphasize key points. Bright colors were used as well for attractiveness. The final posters were approximately three feet wide by two feet tall. Posters were pre-tested by two high school educated Mexicans by appropriately identifying the significance of the images on the posters.

Measures and Data Analysis

Data analysis was performed using Microsoft Excel 2000 and SPSS 13.0, 2004. Univariate analysis was performed on all data. Multivariate analyses (Wilcoxon rank and Fisher exact) were performed with demographics and opinion/behavior serving as the independent variable and aggregate quiz scores as the dependent variable. Demographic variables were dichotomized based predominantly on mean values although histograms were viewed for other possible trends. Demographic data were compared against that of the Mass League data and the primary survey for congruence. Independent variables were contrasted against each other to verify independence.

Results:

Mass League Dataset Analysis

The Mass League dataset contains 12205 healthcare encounters covered from 1998 to 2005 from nine health centers. A total of 1102 encounters (9%) were at the UCONN Farmworkers' Clinics organized by the medical students (Table 2). From all the Mass League health care encounters, 54% involved Hispanic (of which 22% were Mexican), 39% Jamaican compared to 58% Hispanic (38% Mexican), 39% Jamaican for UCONN served primary care clinic encounters. The percentage of Mexicans increased throughout the years (Table 3). The mean age of the workers was 38.9 [standard deviation (SD) $\pm$12.7]; the mean age for Jamaicans was 44.9 (SD$\pm$7.9) and 31.8 (SD$\pm$13.7) for the Mexican population. Figure 2 shows the data from the working season compared to the off season. All potentially "work-related diagnoses" groups were identified and were significantly higher ($p < 0.01$) in months of highest farming activity (from June to October) compared to the off season months for 2000-2005. Groups of potentially occupational illnesses included musculoskeletal injuries/diseases, traumatic injuries and acute intoxications (poisoning), and respiratory, eye, and skin irritation or infection. The proportion was calculated from the total encounters because the number of workers present in the region at any given time is unknown. Figure 3 provides the number of diagnoses during the months of a working season. UCONN Farmworkers' Clinics encounters, when compared to all clinic visits diagnosed significantly higher infectious disease (Chi-square $p<0.002$) and traumatic injury and poisoning ($p<0.0002$) cases. There were no significant differences between the percentages of UCONN and a

single farm initially analyzed for any diagnosis group (in 2005). Individual diagnoses of note were approximately 300 fungal infections and 1605 dental visits.

Table 1. Yearly Total Number of Encounters (Visits) (Mass League)

Year Services Provided	Encounters (% of total)
1998	321 (2.6)
1999	1031 (8.4)
2000	795 (6.5)
2001	1950 (16.0)
2002	1784 (14.6)
2003	1951 (16.0)
2004	2299 (18.8)
2005	2074 (17.0)
Total Visits	**12205**

Table 2. Population Groups from 1998-2005: Mass League Data

	All Farms	UCONN Farmworkers' Clinics
	N (%)	N (%)
American	1 (0.01)	-
Asian/Pacific	24 (0.20)	-
Black/African American	41 (0.34)	6 (0.54)
Haitian	17 (0.14)	-
Hispanic	6608 (54.14)	638 (57.89)
Jamaican	4786 (39.21)	434 (39.38)
Unreported	648 (5.31)	18 (1.63)
White	80 (0.66)	6 (0.54)

Table 3. Yearly Number of Encounters for Specific Populations (Mass League Data)

Year	Mexicans*	Jamaicans
	Frequency (%)**	Frequency (%)**
1998	20 (6.2)	100 (31.2)
1999	57 (5.5)	239 (23.2)
2000	46 (5.8)	476 (59.9)
2001	345 (17.7)	89 (42.0)
2002	336 (18.8)	803 (45.0)
2003	423 (21.7)	815 (41.8)
2004	758 (33.0)	628 (27.3)
2005	*678 (32.7)*	*906 (43.7)*
Total	**2663 (21.8)**	**4786 (39.2)**

* Mexican ethinicity was chosen because they comprised the predominant Latino group at the farms in CT.
** Proportion of Mexicans or Jamaicans seeking medical care in the clinics in each year

Figure 3. Working Season versus Off-Season Diagnoses (Mass League Data- 2000 to 2005)

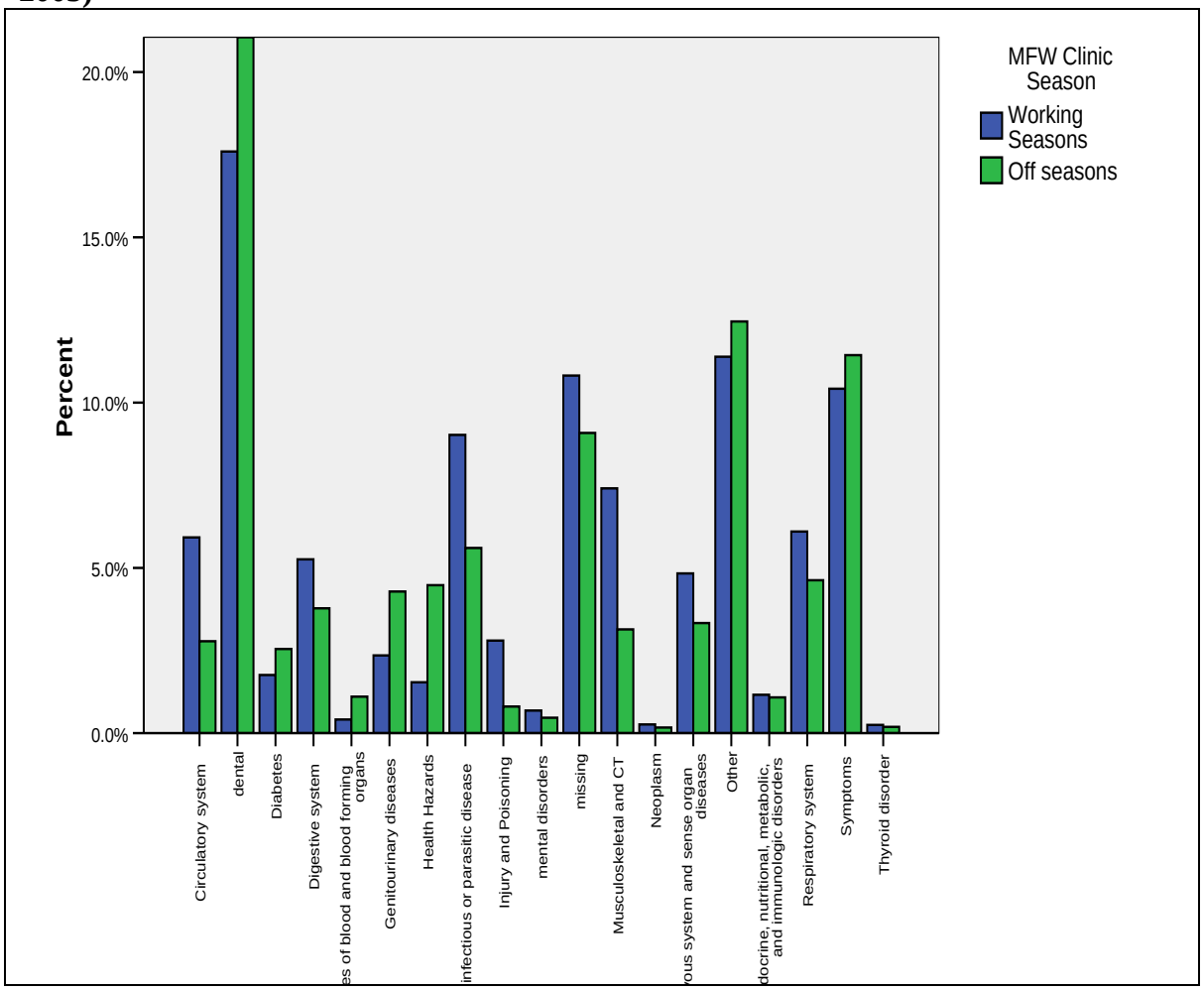


Figure 4. Diagnoses in one Working Season (Mass League- 2005)

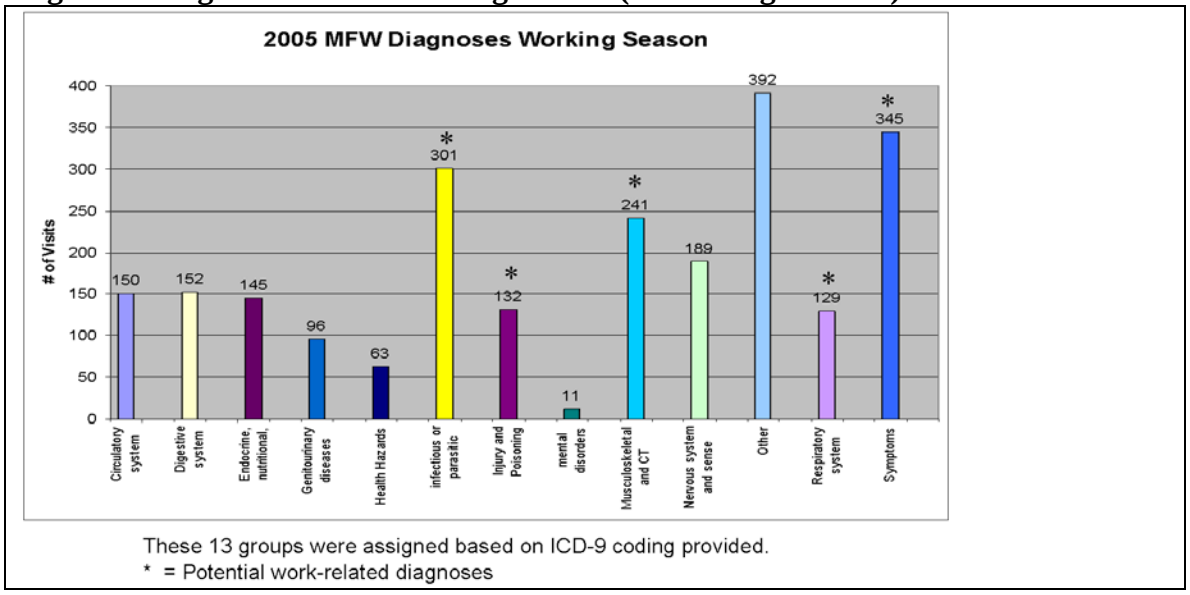


Figure 5. Potentially Occupational Related Diagnoses in the 2005 Working Season (Mass League Data)

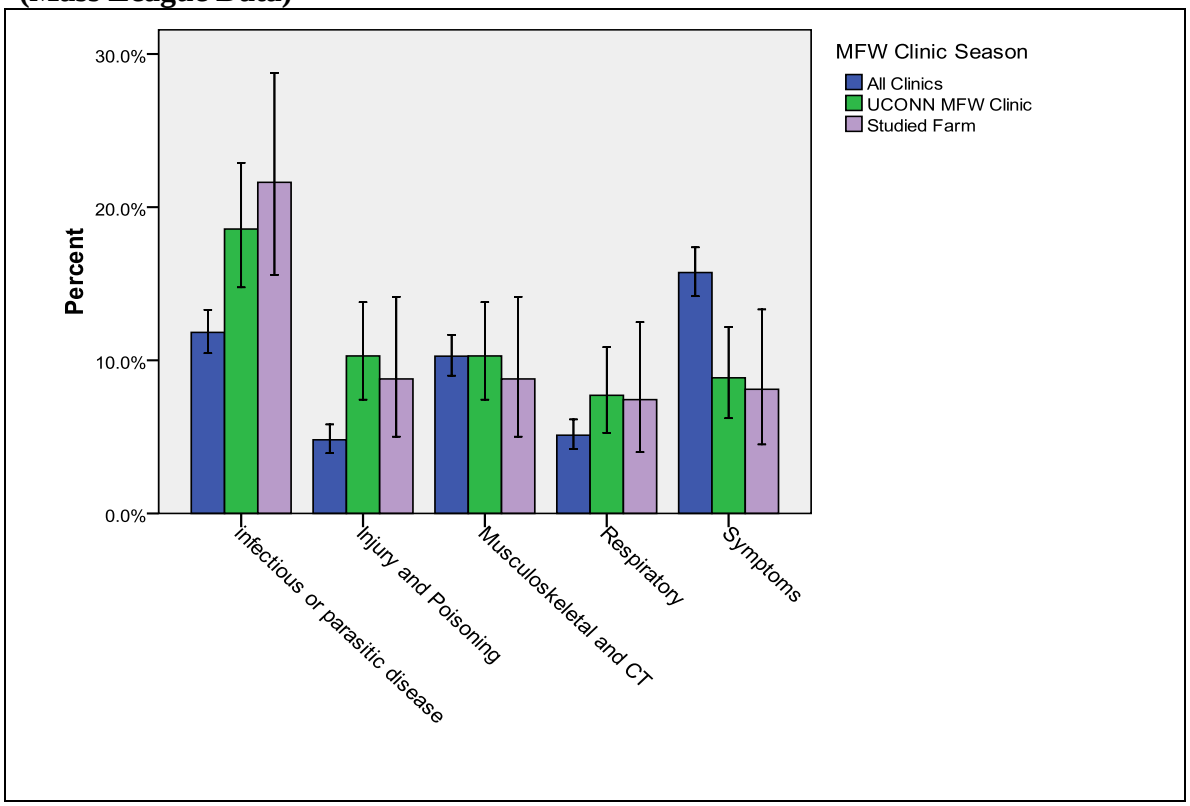
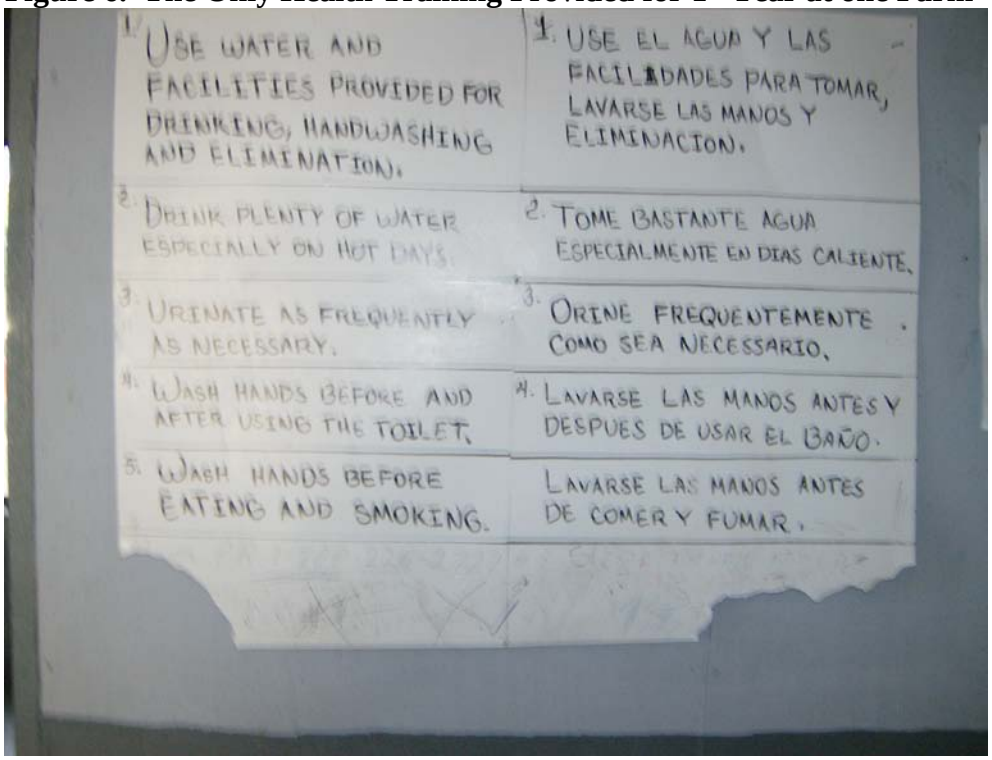


Figure 6. The Only Health Training Provided for 1st Year at one Farm



Focus Group, Initial Survey, and Observational Results

Knowledge appeared to be better than that reported by the literature in regards to health safety techniques. While external etiologies for poor outcome were present, lack of knowledge was apparent in several key areas including fungal infections and heat stress that may contribute to poor health outcomes. Workers, however, reported lack of resources and control as reasons for poor health behaviors. Specific problems identified included not knowing which pesticides were used, non-availability of soap and towels to hand wash before lunch, and limited shade for sun exposure protection secondary to time constraints. The images to be used in the pictorials were identified and interpreted correctly. Table 4 demonstrates the results of the initial survey and the extent of the workers' pesticide training at the one farm studied.

The inspection of the barracks during evening hours showed that 52% of the workers' quarters observed had dirty clothes inside the closets and 35% stored their boots under the head of their beds (Table 5). Additionally, the majority of workers did not change or shower after work before eating dinner, as dinner was ready upon arrival from work. Some did not wash their hands. The nearest hand washing station to the cafeteria was in the barracks.

Table 4. Primary Survey Results on Safety Training at one Farm (N=34)

	N (%)
Ever applied pesticides in the past	19 (56)
Received safety training in the past	15 (44)
Received safety training at every farm	6 (18)
Ever received other health promotion education / training	5 (15)
Think pesticide exposure can have long term effects	8 (24)

Table 5. Observational Results

Where are work boots stored?	N (%)	Where are dirty clothes?	N (%)
Foot of Bed	18 (42)	Foot of Bed	4 (19)
Head of Bed*	15 (35)	Head of Bed	3 (14)
Closet	6 (14)	Closet	11 (52)
Wearing Still	2 (5)	Wash Daily	3 (14)
Hall	2 (5)		
Total	**43**		**21**

Clean clothes kept universally in closet separate from dirty.
*Head of bed = directly under pillow.
Observation taken around 7:30 pm, 2.5 hours after work ended.
Dirty clothes kept mostly in laundry baskets.

Of those workers surveyed during the 1st summer, 44% reported ever having received pesticide training and only 18% having been trained at every farm (Table 4). Those who applied pesticides may have been more likely to receive any training (P=0.07), though the results were not significant. Only 24% of the surveyed workers thought there were health effects from having long-term exposure to pesticides. Greater than 50% of those responding the initial survey farmed in Mexico prior to arriving in the United States, 85% were with neighbors, and 50% with some family member accompanying them contrary to the literature's "isolated" population. Around 38% had medications shipped to them from their home country. Those provided with a pictorial about heat exhaustion scored higher knowledge on how to avoid it (Wilcoxon rank $p<0.0003$) than the controls. There were no significant differences in other pictorial/quiz question results (see Table 6). Overall, pictorials significantly improved quiz scores. None of the demographic parameters analyzed significantly affected the scores in this small sample.

Table 6. Impact of Pictorials on Quiz Scores

	Saw pictorials?		
	Yes	No	
	Mean (SD)	Mean (SD)	P value
Heat Exposure	4.8 (1.0)	2.6 (1.5)	<0.001
Athelete's Foot	2.3 (1.3)	2.0 (1.0)	0.342
Personal Hygiene	5.5 (1.2)	5.2 (1.1)	0.650
Dental Care	3.2 (0.7)	3.3 (0.9)	0.573
Total	**15.4 (2.7)**	**11.1 (4.4)**	**0.004**

Intervention Implementation and Demographics of Subjects

The total number of individual participants during year 2 was 220 with 195 completing the pre-poster survey and 177 completing the post-poster survey. The majority were Latinos, predominantly from Mexico, and the rest of Jamaican descent. Additional demographic information can be seen in table 7. The sample was split into two groups, Jamaican and Latino, due to different demographic profiles in age, education, and work experience. Jamaicans averaged 47 years of age, 9-10 years of education, and had spent far greater time in agriculture in the US as compared to Latinos. About 90% of all surveyed Jamaican workers had received past education about pesticides and 48% education about sun exposure. The Latino workers average age was 30, similar to that reported in the literature and from previous year's survey and Mass League data analysis. The school education years of the Latino workers was 7 ± 3, which is higher than reported in the literature [33] and 55% responded that they had received pesticide training in the past. History of previous pesticide training was more frequently reported by the Jamaican workers, with a greater proportion having received training at every farm. Workers with heat exposure prevention training and the proportion with history of application of pesticides in the past were similar for the two groups of farm workers. Table 8 demonstrates these differences between the Jamaicans and the Latino farm

workers survey respondents. For both populations, demographics of age and education level were statistically similar for pre and post surveys (see Table 9).

Table 7. Demographic and Behavioral Data from Second Summer Surveys

Demographic*	N	% Affirmative	Mean (SD)
Age (years)			32.6 (12.2)
Country of Origin	220		
Mexico	145		
Puerto Rico	4		
Jamaica	69		
Other	2		
Years of School			7.48
Years Working at Farm in USA			3.43
Farm type worked at			
Tobacco		91.7	
Orange		62.7	
Apple		53.2	
Berry		14.6	
Job Type at Farm[$]			
Cook		9.7	
Pesticide Sprayer		13.6	
Gatherer		59.1	
Planter		41.5	
Ever Taught about Sun Exposure Risks		54.1	
Ever Applied Pesticides		28.5	
Ever Taught Anything about Pesticide Exposure Risks At EveryFarm?		39.9	
Behavior/Attitudes			
Own a Brimmed Hat		87.0	
Own Sunglasses		45.9	
Own Long-sleeved Shirt		88.8	
Own Gloves		65.6	
If Could, Would Most of the time or Greater			
Stay in Shade		72.2	
Wear a Hat		77.5	
Wear Sunglasses		28.4	
Wear Long Sleeves		73.6	
Wear Gloves		45.0	
Actually Change Within 15 Minutes After Work		77.6	

* Some questions not present on Post-poster survey

[$]Some workers performed multiple tasks at different times during the season

Table 8. Demographics of Survey Respondents

	Jamaicans *(n=42)*	Latinos *(n=149)*
Age (mean ± SD)	46.7 ± 9.8	29.5 ± 10.4
Mass League Data Age	44.9 ± 7.9	31.8 ± 13.7
Years in school (mean ± SD)	9.6 ± 3.3	6.8 ± 3.1
Years in US agriculture (mean ± SD)	14.3 ± 9.3	4.0 ± 4.3
Past education about pesticide risks (%)	90%	55%
At every farm? (%)	54%	36%
Past education about sun exposure (%)	48%	52%
Ever applied pesticides (%)	31%	27%

Table 9.
Demographics of Survey Respondents Analyzed Pre- vs. Post-Poster Display

	Jamaicans				Latinos			
	Pre-poster		Post-poster		Pre-poster		Post-poster	
	N $\bar{x}$ [#]	*m* [*] *σ*	N $\bar{x}$	*m* [*] *σ*	N $\bar{x}$	*m* [*] *σ*	N $\bar{x}$	*m* [*] *σ*
Age	42	*46*	26	*48*	149	*27*	151	*27*
	46.71	*9.82*	47.54	*9.29*	29.47	*10.45*	29.32	*9.95*
Grade	39	*10*	25	*11*	150	*6*	150	*6*
	9.59	*3.30*	10.84	*4.53*	6.85	*3.09*	6.99	*3.05*
Years in Agriculture	41	*17*			147	*3*		
	14.27	*9.18*			3.99	*4.26*		

[#] $\bar{x}$ = mean
* m = median

Knowledge and Survey Outcome Scores

Based on the preliminary findings, knowledge about heat and pesticide exposure prevention was chosen as topics for the knowledge interventions. Using unpaired analysis, Latinos scored significantly higher on the heat exposure prevention poster by approximately one point (Table 10). Using paired analyses, the change was near significance ($p = 0.056$), independent of viewing the posters (Table 11). The pesticide exposure prevention poster had no impact on Jamaican's scores. Jamaicans scored

significantly higher (p=0.017 and p<0.001) than the Latinos on heat and pesticide quizzes respectively.

Table 10. Survey Outcome Score Results Comparing Pre- vs. Post-Poster Display

	Jamaican				Latino			
	Pre-poster		Post-poster		Pre-poster		Post-poster	
	N $\bar{x}$	*m* *σ*	N $\bar{x}$	*m* *σ*	N $\bar{x}$	*m* *σ*	N $\bar{x}$	*m* *σ*
Heat Score	42 7.29	*7.50* *1.69*	26 8	*8* *1.47*	152 6.50	*6* *2.18*	149 7.15	*7* *2.12*
Pesticide Score	42 9.52	*10* *1.40*	26 9.58	*10* *1.13*	151 7.10	*7* *1.84*	150 6.75	*7* *1.87*

Table 11. Knowledge Outcome Score Survey Results Before and After Educational Poster Display (p-values)

	Jamaicans		Latinos	
	Heat	Pesticide	Heat	Pesticide
Unpaired analysis (n= 68, 301)*	0.086	0.984	0.004	0.378
Paired analysis (n= NA , 66)	NA	NA	0.056	0.378

- = sample size too small for paired analysis

*(Jamaicans, Latinos)

Only one demographic difference in each population played a role in survey outcome scores. For the Latino population, the older workers (>28 years old) and for the Jamaicans, those having more years in US agriculture scored higher on the heat exposure prevention portion of the questionnaire (Table 12). Those reporting having viewed the heat exposure did not score higher than those that did not (Table 13). Reported behaviors were not correlated with pesticide scores. Also, there was no significance in either group of workers considering their ownership of PPE such as hats, long sleeved shirts or gloves.

Behaviors and Attitudes

The majority of workers (>85%) reported that they owned hats and long sleeved shirt for use in the fields. However, less than 50% reported having sunglasses available despite sunglasses being provided in previous years during health fairs and by the

UCONN Farmworkers' Clinics. This proportion remained constant in the post-survey despite having provided sunglasses as incentive for completing the initial study. Gloves were reported to be available less than 70% of the time. Seventy-eight percent said they changed clothes within 15 minutes after work. Using the Wilcoxon rank sum, reporting desire to use protective items correlated significantly with those that currently had access to the items (Table 14). For the Latino workers, those spraying pesticides were significantly ($p<0.01$) more likely to have received education in pesticide exposure prevention. This finding was not significant for the Jamaicans (Table 14).

Table 12. Knowledge About Heat Exposure and Pesticide Exposure Risks

	Jamaican		Latino	
	Heat	Pesticide	Heat	Pesticide
Median Age (> 46, >28)	0.604	0.506	0.006*	0.265
Grade >6	0.254	0.690	0.087	0.787
Years in agriculture ≥2	0.008**	0.029**	0.393	0.225
Taught about	0.108	0.801	0.318	0.079
Applies Pesticides	0.411	0.303	0.426	0.735

*Older did better

**More years experience did better

Wilcoxon Rank P values

Table 13. Impact of Actually Viewing Poster

		Jamaican (pest*)		Latino (heat**)	
		Yes		No	
		N $\bar{x}$	*m* Σ	N $\bar{x}$	*m* σ
Looked	Yes	22	*8*	123	*7*
at		7.91	*1.44*	7.32	*1.95*
poster	No	4	*9*	18	*7*
		8.50	*1.73*	6.78	*2.34*
P value***			*0.455*		*0.459*

*pesticide prevention poster

**heat exposure prevention poster

***Wilcoxon Rank

The Latinos who reported they would stay in the shade or wear a hat for sun exposure protection scored higher on the heat prevention exam. For Jamaicans, the only

significant impact of training on heat prevention was for those saying they would wear long sleeves (Table 15).

Table 14. Bivariate Analysis of Behavior Data

If own	*Assuming had, would wear*	**Wilcoxon Rank Sum** n (p value)	
		Jamaican	Latino
Hat	Hat	67 (0.005)	294 (<0.001)
Sunglasses	Sunglasses	66 (0.001)	277 (<0.001)
Long-Sleeve	Long Sleeve	64(<0.001)	293 (<0.001)
		Fisher Exact n (p value)	
If…..	Did you…….	Jamaicans	Latinos
Currently spraying pesticides at farm	Ever Sprayed Pesticides	35 (1.00)	133 (0.748)
Ever applied pesticides	Taught about Pesticides	37 (1.0)	147 (0.00)

Table 15. Correlation of Knowledge and Reported Behavior

	Jamaican		Latino	
	Heat	Pesticide	Heat	Pesticide
Stay in the Shade	0.317	-	0.006	-
Wear Hat	0.935	-	0.033	-
Wear Sunglasses	0.196	-	0.304	-
Wear Longsleeves	0.047	0.229	0.057	0.866
Wear Gloves	0.052	0.091	0.001	0.621

Wilcoxon Rank P values

Discussion:

Design

In retrospect deciding to perform focus groups, observations and the primary survey in the first summer rather than constructing the experimental design based solely on databases and literature improved the project. The Mass League data identified many illnesses by their symptoms. While providing useful information in some regards, abstraction of symptoms to their cause was necessary. When the diagnosis is readily apparent from the signs or symptoms such as high blood pressure or a musculoskeletal injury, a database alone is useful, but for work-related illnesses such as heat stress and pesticide exposures the database alone was not felt to reflect the problems encountered. The literature was also inaccurate for the given population, suggesting a lower educational level and more isolation of workers than present at the given farms. This would have resulted in simpler surveys and posters, perhaps inappropriate for the given population. Therefore, secondary to the limited prior experience working with this population, focus groups, observations, and the primary survey were needed steps.

Study Results

The premise of this study was that implementation of properly designed posters, a low resource requiring intervention, may elicit increased health related knowledge, change behavior, and ultimately decrease illness in the MFW's population, with this study's focus on increasing knowledge and evaluating improvement in behavior. The results of this study showed that the heat exposure prevention poster had a significant positive effect on the knowledge of the Latino workers but no significant changes were seen in the pesticide prevention poster intervention or in the Jamaican group. This

positive finding was not significant when using paired analysis which may be due to the small sample size. Other possibility for the lack of response could be based on the "social theory" interactions, where through the social structure of families and neighbors the information is disseminated through social interactions/discussions rather than by viewing the poster alone.

The absence of change seen in survey scores for the Jamaican workers is likely secondary to their greater experience (more years farming in the US) and reported greater past pesticide exposure prevention training. The questionnaire/poster were initially intended for the Latino population and not piloted with the Jamaican group of workers. Therefore, the level of difficulty and framing of the questions may have been inappropriate and contributed to the insignificant change in scores provoked by the poster. Additional reasons for insignificant changes in scores include failure to read poster, failure to understand poster, poor poster placement, or failure to appropriately fill out the survey.

Other than ethnicity, the absence of impact of demographics and past training on knowledge or reported behavior was surprising with its emphasis in the literature as an explanation for adverse outcomes. The absence of impact of prior training in the Latino population is concerning, suggestive either that material on the quizzes did not correlate with past training or that past training information was not retained. The low training rate and possible low quality of training are likely due to poor enforcement, cost and resource issues, and decreased sense of usefulness by workers and owners. The absence of observed differences with the education level of the studied groups suggests that the literacy level of the educational modules was not a constraining factor.

Based on this study, knowledge outcome scores had some limited correlation with behavior but no statistically significant improvement demonstrated after the poster placement, suggesting that the change in knowledge was not significant enough, the sample was too small to detect a significant difference, the paradigm is incorrect, or not enough time was provided to observe the behavioral change that follows knowledge adquisition. Other factors, such as access to PPEs, closeness to shopping plazas, availability of transportation, training at the farms, and external restrictions may have played a greater role than knowledge on determining the workers' behaviors relative to heat and pesticide exposure prevention.

Finally, the strongest correlation seen with behaviors was having access to the appropriate PPEs, a finding in both populations with the exception of having access to sunglasses. Other unidentified factors could be responsible for this exception.

Limitations:

Several limitations need to be addressed regarding the present study, the studied population, their restrictions, and the methods of the study. The initial study, based on the 1st year findings, was to be performed on a predominantly Latino population. However, the demographics of the farms changed and that was no longer feasible. As discussed in the results, the Jamaican population was different in age, training, years of farming, education level, and language. Additionally, the knowledge of these factors was unknown prior to the intervention. For example, if it had been known that the Jamaicans had yearly pesticide training, the pesticide education poster likely would not have been used as this knowledge complicated quiz analysis. Pre-testing was also not performed

with the Jamaicans resulting in misinterpreted questions (the phrase “light colored” in reference to clothing did not mean close to white to the Jamaicans) augmenting the possibility of systemic error.

Based on the confounding knowledge secondary to past training, the results from the analysis of these educational interventions cannot be extrapolated to other educational topics. If the study were to be repeated, a health topic where workers have no prior knowledge should be used as analysis of quiz results will be clearer. If a less known health topic had been used for the posters, initial scores would be expectedly near zero such that fewer questions could have been used.

Policy Implications:

Migrant farm workers have an elevated morbidity compared to the rest of the working population. [21, 51] Behaviors leading to this disparity could be due to MFW’s knowledge, attitudes, or environmental factors outside of their control such as supervisor’s orders, supervisor’s knowledge, unnecessarily hazardous conditions, or faulty equipment. The morbidity disparity has been addressed in the past by the implementation of the WPS, which requires workers’ education, restriction of entry times into fields after pesticide deposition, and many other regulations. Regulations are in place for MFW including hours, wages, deductions from payroll and benefits, transportation, housing, training, sanitation, and pesticide education guidelines. Additionally, many advocacy groups (La Via Campesina, International Convention for the Protection of the Rights of Migrant Workers and their Families, The Rural Coalition’s Student Action with Farmworkers, Migrant Housing Campaign, Coalition of Immokalee

Workers, Oregon Union of Farmworkers and Tree Planters, United Farm Workers) are fighting for more.[3] The continued failure of the system despite all this is a reason against solely implementing policy to increase PPE usage. Enforcement needs to increase. However, as seen from the results of this study and reports from others, these regulations have not been enforced,[42, 46] with the cost of hiring inspectors being a predominant reason for failure. Increasing knowledge can only improve health in situations where the MFW have control to utilize their new knowledge. Reducing hazardous conditions or re-fitting faulty equipment would likely require new regulations and subsidization as seen by recent efforts in the State of New York to do so.[36] This method is expensive, and, even with the subsidies, many farm owners are not updating their equipment because they are not required to.

For the reasons above, this study sought to avoid interventions with more policy implications requiring large financial investment or that might not be supported by owners. Just as with the WPS's required warning signs prior to field re-entry, the requirement of educational material in a poster format is feasible, relatively cheap, and easy for inspection and for the farm owner to implement. However, the findings of this study are not strong enough to recommend poster education. Even if the knowledge scores increased throughout after poster implementation, the correlation would still need to be shown with future research in health outcomes.

Future Research:

The MFW have co-morbidities, which can plausibly be reduced with interventions. Intervention efficacies for MFW have not been fully evaluated such as

worker's knowledge and its impact on outcomes. Ultimately, from this study there are four areas where further research is needed: 1) evaluation of PPE impact on behavior, 2) evaluation of PPE impact on outcomes, 3) repetition of this study with a less confounding health topic, and 4) as knowledge did not greatly impact on behavior, observation whether environmental modifications, improving convenience and control of workers, would change health outcomes.

For the selected PPE, access was more strongly correlated to behavior than knowledge and as such may be a more effective intervention. As mentioned in the limitations section, performing a similar study with another health topic should occur. The possibilities could include simple treatment or prevention of various illnesses found within the Mass League database (such as fungal infections) that changes in outcomes could be observed. If questions were difficult enough that the pre-intervention survey scores were near zero, evaluation of the intervention's effect could be clearer.

Other groups, such as farm owners or supervisors, should also be interviewed and educated. Their support is needed to improve MFW's health outcomes as they have control over the workers and their work environment. By understanding reasons behind their actions, new policies can be appropriately tailored to them. For example, for the WPS's requirement of education of MFW, it is unclear whether the absence of regulation adherence is due to lack of knowledge or other reasons.

Conclusions:

Currently, in select locations in the US, there are programs available to improve knowledge, behavior, and health outcomes of MFW. With this population having an increasingly high burden of poor health outcomes secondary to work type, location, housing, and habits, it is essential to continue research on methods to reduce poor health outcomes. Outreach worker provided education, although unquestionably effective, requires high amounts of resources including certification programs, state or local structural components, and high annual funding. In regions such as Connecticut, due to the absence of these programs in place, lack of political and financial support, the high turnover rate, and the greater diversity of MFW's cultures outreach work is more difficult. Therefore, although we should continue evaluating methods that optimize health improving strategies, other methods as well need to be investigated.

This study investigated posters as an easy method to improve health outcomes to change knowledge and behavior of MFW. One of the findings was that that there is limited value in providing educational knowledge and training without providing the tools or protective gear for performing the safety behavior. Further research needs to be performed to understand the reasons behind this, especially as many of the farm workers were within walking distance of places where they could buy their own protective equipment at a relatively inexpensive price. Furthermore, knowledge changed, but had no significant impact on behavior, suggesting that other intervention methods should be investigated.

Overall, the results support some of the qualitative observations from previous studies. Safety education is lacking for the MFW's population and the effectiveness of

education on improving knowledge and behavior is questionable. However, because knowledge is very limited as observed in the survey, room for educational training and improvement in knowledge is still recommended assuming the initial paradigm to be correct. Ultimately, improvement in health outcomes can occur with an investment of resources and changes in policy that address MFW's behavior, based on their beliefs and availability of PPE.

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Appendices

Appendix A. Social Programs Available to Assist the MFW population

Several federal programs were established, beginning in the 1960's, to address some of the health and social disparities of migrant and seasonal farm workers (MFW) and have continued to this day. However, a significant portion of funding is derived from state and local resources, resulting in variability of support from state to state. Many of the state and local interventions are not novel but rather have been adapted from those used to serve other minority and vulnerable populations. Following is a brief description of the most important US programs and policies for migrant farmworkers.

Worker Protection Standard: Environmental Protection Agency

The Worker Protection Standard (WPS) through the Environmental Protection Agency (EPA) is designed to reduce risk from pesticide exposure. The standard was initially approved in 1974 and updated in the 1990s to include prohibition of spraying pesticides while workers are in the field. Additional regulations passed include requirements about when and where pesticides are applied, the mandating of basic pesticide safety training every five years, and the supply of soap, water and individual or disposable towels to be present for self decontamination.[34, 52]

Migrant Head Start: Health and Human Services

The Migrant Head Start (MHS) law enacted in 1969 provides services for children from birth through compulsory school age and offers an alternative to having young children spend their days in labor camps or in fields with their parents. At present, MHS has

functional programs in 34 States with more than 35,000 children enrolled annually, of whom forty-one percent, or approximately 14,350 children, are from birth through 3 years of age. Program operations, including the location of center sites and the length of operating periods (ranging from 6 weeks to 9 months), are guided by the location and timing of the seasonal agricultural work.

Migrant Health Act: Heath and Human Services (HHS)

Enacted in September 1962, The Migrant Health Act (MHA) funds Migrant Health Centers (MHCs), which provide a broad array of medical and support services to migrant and seasonal farm workers and their families, such as access to comprehensive medical care services with a culturally sensitive focus. Services may include primary care, preventive health care, transportation coverage for medical appointments, outreach counseling, and dental, pharmaceutical, and environmental health care. These programs use lay outreach workers, bilingual/bicultural health personnel, and culturally appropriate protocols often developed by the Migrant Clinicians Network. They also provide prevention-oriented and pediatric care at MHCs, such as immunizations, well baby care, and developmental screenings. As assigned in Section 329 of the MHA, funding can be channeled directly to MFW-dedicated community health centers or, in regions with fewer workers, directed through federal voucher programs. In Connecticut and Massachusetts, the Connecticut River Valley Farmworker Health Program (CRVFHP), a program of the Mass League of Community Health Centers, provides these voucher services.[6]

Migrant Clinician's Network

Migrant Clinician's Network (MCN) is a non-profit organization that focuses on the Health of US MFWs and other mobile, poor, and culturally displaced populations. It consists of an interdisciplinary team with the objectives of providing:

- Primary, secondary, and tertiary oral, physical, and mental health care access
- Quality Improvement serving the mobile poor
- Occupational and environmental health
- Preventive health, through immunization for vaccine preventable diseases
- Family Violence prevention and intervention
- Research safety and justice as it impacts the mobile poor
- Capacity building for health centers and communities
- Health education and training
- Professional development across all clinician disciplines
- Cultural Competency training
- Direct technical assistance to organizations and communities serving the mobile poor[39]

Migrant Education: Department of Education

The Office of Migrant Education (OME) administers grant programs, which provide academic and supportive services to the children of families that migrate to find work in the agricultural and fishing industries. The goal of the Migrant Education Program is to ensure that all migrant students reach challenging academic standards and graduate with a

high school diploma (or complete a GED) that prepares them for responsible citizenship, further learning, and productive employment.[34]

Job Training Partnership Act: Department of Labor

The purpose of the Job Training Partnership Act (JTPA) is to establish programs "to prepare youth and adults facing serious barriers to employment for participation in the labor force by providing job training and other services that will result in increased employment and earnings, increased educational and occupational skills, and decreased welfare dependency, thereby improving the quality of the work force and enhancing the productivity and competitiveness of the Nation."[4]

Community Programs of Note

Community health outreach workers (also known as "promotoras") programs began after the Federal Migrant Health Act of 1962 and the Economic Opportunity Act of 1964, mandated outreach activities targeting disadvantaged populations, especially in rural areas with a high poverty rate; these included migrant labor camps. They are usually based out of federally qualified community health centers, migrant health centers, or other clinics. These workers serve as interpreters, provide basic health education, and offer a link between the migrant workers and the groups or agencies providing for their healthcare needs. Many of these programs were based at Indian Health outreach locations in states with larger rural Native American populations (New Mexico, Alaska,

other western states) where the infrastructure for programs including training materials, programs, and certification specific to outreach workers was already in place.[24]

Connecticut Council on Occupational Safety and Health (ConnectiCOSH)

ConnectiCOSH is a non-profit, statewide organization which helps unions, individuals and communities win healthier and safer working and living conditions. Members include local unions, labor councils, community groups, health and safety activists, and health care professionals. Financial support comes from members' dues, union contributions, grants and fundraising events.[2] In Connecticut, during the past few years, *ConnectiCOSH* has received funding from the CT Department of Public Health to do outreach work on sexually transmitted diseases (STD), human immunodeficiency virus (HIV) infection education and testing, and other health-related activities that have involved the MFW population.

Appendix B. Focus Group #1

June 28th, 2006 Focus group (Spanish translation used)

Leaders:

Eddie Sapiain, Will Carter, Dr. Marcia Trape

Questions:

A set of broad questions will be asked (see below). Depending on the responses to these, more specific questions will asked. Discussion of each question will be completed before moving to the next.

1. Do workers receive any training or information before going to work in the fields?
   a. If so what type?
   b. Is there anything that may be missing from the training?
2. Do other workers seem to use resources such as pamphlets and posters regularly?
   a. What is the reason that some don't use the resources? Or … what is the difference between those who use the resources and those who don't?
   b. Is there anything that can be done to increase the use of these resources?
3. It is said that pesticides cause health problems. How does one avoid having health problems from pesticides?
   i. How much control do you have over becoming sick?
   b. What are the symptoms of these health problems?
   c. How long do they last?
   d. How are they fixed?
   e. How do the illnesses progress?
   f. Is there anything that workers currently can do to not get ill that they are not doing?
4. Protective equipment, such as long sleeves, gloves, and face masks are recommended for use while working in fields of tobacco, especially those sprayed with pesticides. Do others you see use this equipment regularly?
   a. Why / why not?
   b. What are the differences between those who do and don't wear the equipment?
   c. Is there anything that would cause others to wear protective equipment?
5. What are workers' other (not pesticide) concerns about health related to the farm (injuries/ illness)?
   a. IF not mentioned, ask about:
      i. Work breaks,
      ii. access to water
6. What illnesses have you seen?

   a. How are these illnesses / injuries generally taken care of?
   b. Is there a better way to take care of that illness/injury?
      i. (IF so,) why isn't it done?

7. Is there anything the farm owner or supervisors could change or provide to improve worker's health?
8. Are there any other changes that you would recommend to improve farmworkers health and safety?
9. Are there any questions?

Appendix C. Focus Group #2

July 1st, 2006 Focus Group #2

The literature suggests that the best way to phrase focus group questions with this population is to ask about other worker's behaviors (questions not directed at individuals).

Questions

1

What health related information would you like to know about?

2

Have you ever had a skin problem? Think of one specific occasion where you

Where was the skin problem? (important for guessing type of rash)

What were all the factors that you can think of that might have caused the skin problem?

Did you take any medicine?

Is there anything you did other than taking medicine make you body heal faster?

Thinking about the problem now, is there anything you could have done to have avoided having the skin problem?

3

Drinking water in field etc to avoid dehydration

How much water did you drink today while in the field?
Do you feel you drink enough?
If not, what causes you to not drink enough?
What are the signs that one has become dehydrated?

4

Clothes washing

How many sets/ pairs of work clothes do you have?
How often do you wash your work clothes?
Are they usually dried before you put them on?

Always most of the time sometimes rarely never

Possibilities for **knowledge** based questions (these could be for things that need to be addressed but I can't adequately assess behavior):

Handwashing in fields : how often, reasons for doing it (when do you do it)

Water usage in field

Using bathroom when need to … maybe

Clothes washing: separately, how often

Behavior – can check to see how many change their clothes before dinner,
Handwashing is a possibility
Clotheswashing

Appendix D. Observational and Interaction Visit Notes #1

July 10th, 2006
Observational and interaction visit

I arrive at the farm around 5:10 and was told by Jesus that the work day on that specific date ended at 6:30pm. So I waited in the car occasionally watching the barracks. Jesus was walking back in forth from his office area (near kitchen) sometime thru the barracks (as if inspecting) and to the outer area where some workers were. During this time there were no workers in the area (near barracks or near)

The barracks had the posting as required by law and nothing more. The cafeteria seemed relatively well ventiliated. There was only one poster present which said in both English and Spanish to wash you hands before eating (and a few other things such as wash you clothes … something else , basic WPS).

The workers appaeared to have been bused back from various parts of the farm, and came in a pack. Several seemed to be jogging/running in a playful manner maybe to try to get to the front of the dinner line. All were carrying coolers. Most carried personal size coolers but a few carried ones that had to be wheeled. They headed directly for barracks, Most seemed to spend less than a minute inside the barracks and emerged sometimes from the front entrance, sometimes from the back. They were still wearing their work clothes It was clearly evident if someone had changed from their work clothes b/c there was a clear amount of dirt on the clothes (both pants and shirts).

I stood in line outside the door and did some small talk. Apparently their workday schedule varies. The last time I was up there (with Israel July 1st) they had woken at 4:30 AM to start work. Today they began work at 6AM and worked a 12 hour shift.

Once inside I sat at one of the middle benches to see if anyone would sit with me. The 1st group of people all sat at different spots although they appeared to be sitting in clicks. The 1st person to sit at my table was a 20 or 21 year old from the state of San luis. He brought me some "agua" which was a cup of rather sweet fruit punch. He had spent a bit of time in Texas which he thought was a nice area and said he liked CT. before Working at the farms he had been in school and knew occasional English words but not how to form sentences. He had gone through high school. I asked him whether he intended on going to college and he seemed to imply that he would like to but could not afford it. He played soccer and basketball while in high school and occasionally played basketball while at the farm.

I asked him about the food, which consisted of lettuce and some other chopped vegetables, what appeared to be something similar to fried pork chops, brown beans, some sort of spaghetti, chopped canned pinapples, and fried corn tortillas. He said the food was very similar to what he ate in mexico. The only drinks offered were fruit punch

and lemonade. Many people brought their own cups from the barracks although cups were provided.

I asked a man about his hat (which said something about tres novias), but he couldn't read

A church member comes every Monday to take them to mass at 7:15. Probably about 30 – 40 people went (slightly less than a full school bus)

Appendix E. Observational and Interaction Visit Notes #2

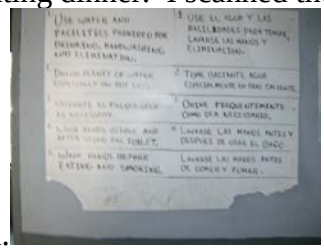
Observational Notes #2 July 16th, 2006

Sunday July 16, 2006

Observations / soccer match

How long does the lunch last? 30 minutes
Where do they eat lunch? In the fields

On Sunday I headed up to Thrall to play soccer with a few of the workers. When I arrived they were in the middle of eating dinner. I scanned the cafeteria and there was only one sign present in the cafeteria.



Nearly identical signs were present in each of the barracks. I looked around for Jesus but couldn't find him so instead went to visit Ismael (the one that invited me to play soccer). At the time he wasn't in his room but his roommates were there. One was listening to learning English audio cds so we went over how to count in English and a few other words. Some have large coolers in their closets where they store foods needing refrigeration (in this case, yogurt, soda, and beer), which they will sell to each other. I did a quick inspection of the bathroom. It appeared relatively clean (especially for a barracks bathroom) but also appeared very moist. More of the floor was covered with water than not, although I saw no signs of mold.

There was mention of stealing being a problem in the barracks

The soccer field was in-between two of the store houses for drying tobacco (neither were currently in use) and the grass was in need of cutting.

On the way back we encounter the "bicycles" used to collect the tobacco leaves. There are three people per bicycle, with one pulling like a wheel barrow, one, pedaling, and one loading the tobacco onto the sheets. I was also shown some of the contraptions used to hang the tobacco in the sheds and the water barrels that are used for drinking water. The water is warm. I forgot to ask whether they wash their hands in using it as well.

Tobacco bicycles

water barrels – notice the water fountain appearance

Appendix F. Focus Group #3

Focus Group #3 - July 17th

Structured Focus Group Setup and Questions

Preparation:
Prior to focus groups, the study co-ordinator will meeting each possible participant >3 days before the date of the focus group and at this time information about the study will be provided including entailments of the focus group session as well as the purpose of the study. 15 farmworkers will be encouraged to attend each meeting. They will be recruited at the barracks and, with permission of the farm owners, during the workday. To ensure the ease of the meeting, the 15 selected at a given time will all use the same language and the meeting will be performed in that language.

Introduction:

Upon time of the focus group meeting, those of the 15 deciding to participate will be provided with consent, HIPAA, and a basic questionnaire form. These forms will be provided in the participants native language. As a portion of this population is known to be illiterate, either the study-coordinator or an assigned participant will read the consent form.

The study co-ordinator will provide his name, explain the purpose of the focus group (to establish the concerns and determine proposed solutions to the concerns of the participants related to occupational risks and exposures), and begin with informal talk (family, weather, sports) to facilitate comfort which will be followed by a quick round of introductions. Beverages and snacks will be provided.

Rules:

Following the introduction, the guidelines of the focus group will be announced. These will include:

1. Stating an interest in knowing the range of opinions held by participants, hoping that they express their own views even when not in agreement with other speakers.
2. Note that this is not intended to be an exercise to persuade others of their pont of view
3. State that everyone will have an opportunity to speak if they want to and they will be given the opportunity to ask questions for clarification.
4. State that everyone will have a given chance to speak if they want to and they will be given the opportunity to ask questions for clarification after which topics will be open for discussion.

We are trying to understand a bit more about you and your understanding of health as a group. Some questions may seem

Questions:

A set of broad questions will be asked (see below). Depending on the responses to these, more specific questions will asked. Discussion of each question will be completed before moving to the next

Sickness and group illness.

1. Need to addresss group living as well
2. The last time that the clinic was here several people seemed to have la gripa.
   a. How do you think you got la gripa?
   b. How come so many people got it?
   c. Assuming the absence of a clinic, what has been done in the past to address la gripa?
   i. If there was no clinic here, what would you have done to treat la gripa?

TRAINING

10. Last time we had a focus group you mentioned that you hadn't received safety training this year at Thrall. Have you received any now?
    a. If so, what was it about?

BATHROOMS

11. Several people mentioned at one point that they were concerned about the cleanliness of the bathrooms.
    a. In your opinion, do you feel the bathroom are dirty?
    i. ¿Siempre or algunas veces?
    ii. ¿Tiene una queja sobre algo en particular?
    b. When and how often are they cleaned?
    c. Is there a way to protect oneself against problems from the bathroom?

12. Are there any issues/ difficulties in going to the bathroom while in the fields?

13. Do other workers seem to use resources such as pamphlets and posters regularly?
    a. Which method would you prefer?
    b. Where should hey be put for the most people to use them / look at them?

HANDWASHING AND LUNCHTIME

14. Handwashing stations in the fields –Does it occur? Do you use the same water for drinking (it is warm) how often / when

15. Can you explain lunch time?

    a. Where exactly do you eat?
    b. When do you eat?
    c. Do you wash hands before eating? Where?
    d. ¿Hay jabon en los campos?
    e. Where do you put (donde queda) your lunches during working hours?

16. Who provides personal protective equipment (PPE)?

    Employer provides:

Worker provides:

8. The last time I was here it seemed that people were rushing to get to dinner. Is there a reason for this rush? Siempre van a la cafeteria rapidamente?

9. Is there anything else related to health that you are concerned about?

10. Boots
a. When do you take off your work boots?
b. How do you store them?

Pictures – trying to understand perception because expressions are different between cultures.

17. What does picture 1 show?
18. What is set 2 of pictures trying to tell?
19. What does picture 3 show?
20. Picture 4?
21. Picture 5 is a rat. If the rat was next to food or in a house, would you associate it with anything. What would you infer / understand from the picture if the rat was in a house or near food?
22. What is picture 6? If picture 6 was next to a food, would it mean anything different?
23. What do the line off the shirt in picture 7 signify? How about the bag below it (what does it signify?
24. What is going on with the man on the ground in picture 8?
25. Describe what is going on with the man in:
a. 9
b. 10
c. 11
d. 12
26. The hand in picture 13?
27. What is depicted in picture 14?
28. Picture 15?
29. What is the man doing in picture 16?
30. What is the message that picture 17 is trying to convey?

Conclusion:
After the series of questions are completed, information about the study, including plans to present proposal based on their commentary, will be re-iterated along with contact information. They will be thanked for their participation.

Appendix G. Primary Survey

Primary Survey: Interview Guide

A. Personal Background Information

First I would like to ask you a little about yourself and your family.
1.Could you tell me a little about yourself?

1. ¿Cuantos anos tiene? _____ anos

2. ¿Cuantos grados ha completado Ud de escuela?

Colegio completo o mas Parte de colegio Menos de colegio

3. ¿De donde es Ud (pais y estado)? _____

4. ¿Por cuantos anos (estaciones) ha trabajado Ud a Thrall? _____

5. ¿Por cuantos anos ha trabajado Ud en los Estados Unidos? _____

6. ¿Con que otros tipos de productos del campo ha trabajado Uds?

Círculo los que aplican.

Tobaco naranja manzana otra

7. ¿Trabajó Ud en una finca cuando estuvo en su pais?
¿Que tipo de finca fue? (animales, productos)?

8. ¿Tiene familia aqui contigo?

9. ¿Tiene vecinos or amigos de su pais contigo?

Si no

10. ¿Por cuantos años mas piensa que va a trabajar en agricultura en los Estados Unidos?

1 2 3 4 5 mas No sabe

11. ¿Que piensa Ud va a hacer cuando terminas trabajando en las fincas?

12. ¿Que tipo de trabajo hacen / hicieron sus padres?

13. ¿Cuales son los asuntos de salud mas importante para Ud y su familia?

14. ¿Cuando esta en los Estados Unidos, puede recibir medicinas, vitaminas, o vacunas afuera del pais?

Si No

ENTRENAMIENTO

C. Experience in pesticide use and exposure prevention in Mexico as well as in the United States

I would now like for us to discuss your experience in the use of pesticides and of pesticide safety. Remember pesticides are chemicals that are used to kill different kinds of pesticides, and they include insecticides, herbicides, fungicides, and rodenticides. Pesticides can be in the forms of granules, powers, liquids and gases, and they can be applied by hand, with hand/backpack sprayers, from tractors and from airplanes.

Experiencia :

15. ¿En el pasado, ha aplicado Ud pesticidas?

16. ¿Recibio Ud entrenamiento usar pesticidas?

17 ¿Lo recibio en cada finca?

Si No

Ask *only* if they worked on a farm while in their home country

18. Respuesta solamente si trabajo en agricultura en Mexico (o otro pais de origen))

19. ¿Que tipo de informacion o entrenamiento sobre seguridad contra pesticidas recibio Ud en Mexico?

20. ¿Cuando recibio Ud esta informacion o entrenamiento? _____

21. ¿Quien presento a Ud esta informacion o entrenamiento? _____

22. ¿Que metodos uso ensenar a Ud?

Folletos carteles videos lectura otra

23. ¿Que tipo de informacion o entrenamiento sobre seguridad contra pesticides recibio Ud a la Finca de Thrall?

Ask *only* if they worked on a farm while in their home country

24. ¿Cuando recibio Ud esta informacion o entrenamiento? _____

25. ¿Quien presento a Ud esta informacion o entrenamiento? _____

26. ¿Que metodos uso ensenar a Ud?
circunde todos que se apliquen

Folletos carteles videos lectura otra

27. ¿Recibio Ud entrenamiento o informacion de seguridad o salud este ano a finca de Thrall?

Si No

Ask only if they say they received training or information

28. Si, recibio, ¿de que ensenaron? (dieta, sanitacion, VIH)

29. ¿Quien enseno la informacion or entrenamiento?

Supervisor promotora outreach worker other

_____

30. ¿Que metodos uso ensenar a Ud?

circunde todos que se apliquen

Folletos Carteles videos lectura otra

31. ¿Que tipo de informacion seguridad de pesticidas o entrenameinto recibó en otro sitios en los Estados Unidos?

Skip if haven't received

32. ¿Cuando recibio este informacion o entrenamiento seguridad de insecticida?

33. ¿Quien le dio el informacion o entrenamiento seguridad de insecticida?

34. ¿Cuales tipos de materials usaron?

Circle all that apply

Folletos Carteles videos lectura otra

D. Knowledge of the ways family members can be exposed to pesticides.

1.¿Como piensa Ud puede estar expuesto a insecticida?

¿En su trabajo?

¿En el cuartel?

E. Ways to prevent or reduce their pesticide exposure

1.Digame como limpia sus ropas por favor.

¿Adonde?

¿Cuantos veces?

¿Hace algo especialmente o diferente con sus ropas de trabajo?

¿Almacenaje?

¿Lava sus ropas de trabajo seperado (de las otras)?

Siempre casi siempre algunos veces raramente nunce

2.¿Donde cambia sus ropas despues de trabajando?

Usualmente, ¿Cuando se banas?

Inmediatamente despues de cena mas tarde Otra(explique_____

Si espera usualmente, ¿por que?

¿Cuantos por ciento banas a cada tiempo?

Inmediatamente despues de cena mas tarde Otra(explique_____

F**. Knowledge of acute and chronic health consequences of pesticide exposure**

Let's turn know to what you have learned about how pesticides might affect your health. Remember, when I talk about pesticides I mean things like herbicides and fungicides as well as insecticides.

Si Ud ha estado expuesto a pesticides, ¿que son los sintomas?

¿Por cuanto tiempo dura los sintomas?

¿Que hace Ud si esta enfermo de pesticidas?

¿Hay condiciones (problemas) malas causan por pesticidas que no aparecen inmediatamente?
¿Que son los condiciones?

QUIZ QUESTIONS

Uno de sus amigos esta trabajando con Ud en los campos y empiece tener problemas de demasiado calor. El no sabe porque siente malo pero el dice a Ud come siente (sus sintomas). ¿Ud. Pude decirme que son 4 de los sintomas possibles que tiene su amigo? ? (what would he complain of, what would he look like?)

Circle one's said correctly, also write in other answers

- Feeling weak, (debil)
- faint or dizzy, (mareo)
- with an accompanying headache (dolor de cabeza)
- nausea (asco)
- Cold, clammy skin with ashen pallor (…. Piel)
- Dry tongue and thirst (boca seca)
- Severe muscle fatigue (muslos fatigos)
- Loss of appetite (…. Apetito o … comer)
- Profuse sweating

Physical collapse, with muscle fatigue and sometimes cramping (desmayo, calambre)

Ud trabaja en un lugar que hace calor y humido. ¿Como puede Ud prevenir fatiga de calor?

- rest, (descanso)
- drinking water, (bebe o toma agua
- and a cool environment (doesn't apply)

¿Donde obtiene problemas de sus pies como hongos? (¿Como puede evitar hongos de sus pies?)

is spread in swimming baths, saunas and showers, floors, from other's foots banos, lleva zapatos

¿Que cosas empeora el problema de hongos en los pies? (¿Que quiere evitar si tiene hongos en sus pies?)

wetness and such.

¿Como curar hongos de pies?

Powders
Creams
ointments
Dry
Clean/ soap

Skin problems
El goberierno recomienda que trabajadores se cambien la ropa dentro de 15 minutos despues del trabajo. ¿Por que es importante cambiar la ropa lo mas pronto despues del trabajo?

¿Por que es importante mantener separada la ropa sucia del trabajo?

¿Piensa que es necesario usar jabon cuando se lava las manos antes dela almuerzo? Explique por favor.

¿En los campos, que cosas en particular causan problemas de la piel?

¿Como cura Ud. problemas de la piel?

Dental hygiene

¿Tiene Ud un cepillo de dientes y pasta dental? _____

¿Cuantas veces por dia cepilla sus dientes? _____

¿Piensa Ud. que es possible contraer infeciones en sus dientes?

¿Que tipo de comida causan caries?

¿Viendo los dibujos animados/programas de television le ayudo a Ud a contestar las preguntas?

Thanks to help of Dr. Arcury et al., Lauren, and Rafael for some translation

Appendix H. Sample Pictorial Attached with Primary Survey

Appendix I. Information Sheet Providers Prior to Groups/Survey

"Analyses of Occupational Injuries and Implementation of Preventive Strategies at Connecticut Tobacco Farms"

Principal Investigator (PI): Dr. Marcia Trapé-Cardoso
Telephone number: 860-679-4564
Co-investigator: William Carter
Duration of participation: 1 hour
IRB number: #06-551

What Is The Purpose Of This Research Study & What Information Is Expected To Result?

The specific aim of this study are to determine the extent that knowledge and behavior deviate from the recommended methods for preventing illness from farm work, and identify the impact of interventional methods on knowledge and behavior. Therefore, while other people may benefit from this in the future, there is a chance that you may not benefit from this. Also, as with any research, there is no way to know that we will find information that makes things better.

Why Am I Asked To Participate & How Many Others Are Expected To Participate?

You are invited to take part in this study because of your job. We expect to have around 100 participants.

Is Participation Voluntary?

Participation in this study is voluntary. Before making a decision feel free to ask the researcher questions.

Your decision to participate or not will not affect the meetings with people from the University of Connecticut Health Center, and if you decline there will be no problems or loss of any benefits you are entitled to.

How Long Will My Participation in This Study Last?

You participation in this study will last approximately 1 hour. You are going to be asked to respond a questionnaire about the success of educational activities implemented in the farm after working hours at a time convenient to you. You may decide not to answer one question. It is possible some of the questions may make you uncomfortable but there are no other risks associated.

How Much Will Cost My Participation in This Study?

It will cost nothing to you.

What Procedures Will Be Done & Are They Safe?

- ***Survey Administration:*** **The study coordinator will ask you to take two surveys which contain questions that assess your demographics, experience, behaviors, and knowledge in respect to pesticide and sun exposures at work.**
- ***Risks from Survey:*** **There are no physical risks associated but you may feel uncomfortable answering some of the questions.**

- ***Safeguards Taken:*** **You may always choose not to answer a question.**

What Are the Benefits Of Participating In This Study?

You may benefit from increased awareness in regards to protection measures against health risks at your job. Based on the results of the study, and educational session will be provided. There is also the possibility that no benefit will come from participating in this study.

Will I Find Out the Results Of This Research Study?

You will be provided with information if it is considered significant and reliable.

What If I Decide To Stop Participating In The Study?

You are free to stop taking part in this survey at any time.

If you choose to withdraw, it will not adversely affect your relationship with the University of Connecticut Health Center. You can leave at any point during the meeting.

Whom Should I Contact if I Have Questions?

William Carter, study coordinator, and Dr. Trapé-Cardoso, principal investigator, are willing to answer any questions you have related to the study. You are encouraged to ask questions prior to deciding whether or not to participate and throughout the course of your participation. For questions related to the survey you may contact the study coordinator (Will) at (404)274-5385 or Dr. Trapé-Cardoso at (860)679-4564.

Appendix J. Study Survey

Illness Prevention Survey

Pesticides and Sun Exposure

Your Name _____

1. How old are you today? _____ years

2. In what country were you born?

United States Mexico

Puerto Rico Jamaica

Other *(Enter Name)* _____

3. What is the highest grade or level of school you have completed or the highest degree you have received?

_____ years

---

4. How many years have you worked in the farm industry in the United States?

_____ years

5. What types of farms have you worked at?
(Circle all that apply) *Example: (tree)*

i. Tobacco ii. Orange

iii. Apple iv. Strawberry

v. Other (*Please list)* _____

---

6. Have you been in the following roles at any time while working at farms?

(Circle all that apply) *Example: (carpenter)*

Cook Pesticide sprayer

Gatherer Planter

Others (*Please list)* _____

Now we would like to hear about thoughts and actions in regard to sun exposure and your experience in the use of pesticides and of pesticide safety. Remember pesticides are chemicals that are used to kill different kinds of pests, and they include insecticides, herbicides, fungicides, and rodenticides. Pesticides can be in the forms of granules, powers, liquids and gases, and they can be applied by hand, with hand/backpack sprayers, from tractors and from airplanes.

Sun exposure

7a. In the past, have you been taught / learned anything in regards to protection from sun exposure?

Yes No

7b. What were you taught? *(please, list)*_____
_____
_____
_____

Pesticide exposure

8. Have you ever applied pesticides?

Yes No

8a. In the past, have you been taught / learned anything in regards to protection from pesticide exposure?

Yes No

8b. Were you taught at every farm?

Yes No

8c. What were you taught in specific? *(please list)*_____
_____
_____
_____

9. Do you own or have regular access to:

Example: Drinking water?	***Yes***	*No*
i. A hat that shades your face, ears, and neck? 	Yes	No
ii. Sunglasses? 	Yes	No
iii. A long sleeved shirt for work? 	Yes	No
iv. Glove for use while picking the crop? 	Yes	No

10. If you owned / have access to the appropriate materials, going out to work in the fields on a sunny day for more than an hour, how often would you …

(place an X in the correct box)

	Always	Most of the time	Sometimes	Rarely	Never	Refused	Don't know
Example: Drink Water?		*X*					
Stay in the shade during breaks?							
Wear a hat that shades your face, ears, and neck? 							
Wear sunglasses? 							
Wear a long sleeved shirt? 							
Wear gloves for protection while picking? 							
How often do you regularly change clothes within 15 minutes after work?							

Below are questions testing your knowledge about sun exposure and pesticide exposures. Please answer them as well as you can.

Note: dehydration = the body has too little water =

Sun exposure

12. Please answer the following questions as true, false, or don't know

Circle True

On a hot day or during hard work, you can lose more than two liters of water per hour.	True	False	Don't know
You will always feel thirsty if you are dehydrated.	True	False	Don't know
Sweating, which helps release heat from the body, is less effective in humid environments	True	False	Don't know
Drinking any type of fluid will help prevent dehydration. (tea, coffee, beer, water, soda, Gatorade)	True	False	Don't know
Sore muscles cannot be due to dehydration.	True	False	Don't know
Drinking water with a little salt and sugar can lessen cramps better than pure water.	True	False	Don't know
Long sleeved cotton shirts protect from heat exhaustion better than short sleeve	True	False	Don't know
Wearing a hat on a hot sunny day increases heat stress on the body	True	False	Don't know
Muscle cramps can be caused by heat and sweating.	True	False	Don't know
Eating more salt will lead to more cramps.	True	False	Don't know
Nausea and headache can be caused by working in the sun too long.	True	False	Don't know
Light colored clothing reflects heat the best	True	False	Don't know
If someone is dehydrated, alcohol can be used to rehydrate them.	True	False	Don't know
Working increases body temperature so you should rest if you feel too hot	True	False	Don't know

Pesticide exposure

13. Please answer the following questions as true, false, or don't know
circle True

i. Only the sprayers are exposed to enough pesticide to be harmful. That is why they wear protection and others do not.	True	False	Don't know
ii. Pesticide-soiled clothing should be removed outdoors.	True	False	Don't know
iii. Hand washing is important before eating to prevent pesticide ingestion.	True	False	Don't know
iv. Pesticide on the mouth, eyes, or face are more harmful to your health than equal amounts on your hands.	True	False	Don't know
v. Trace amounts of pesticides in clothes can be harmful to your health.	True	False	Don't know
vi. Before washing, keep pesticide-soiled clothes with the rest of the dirty clothes.	True	False	Don't know
vii. Pesticide-soiled clothes should be washed separately from other laundry.	True	False	Don't know
viii. Only a few pesticide-soiled clothing should be washed at one time.	True	False	Don't know
ix. Cold water wash temperature is better than hot water when washing pesticide soiled clothes.	True	False	Don't know
x. Liquid detergents do not remove dirt and pesticides from clothing as well as granular detergents.	True	False	Don't know
xi. Pesticides from dirty clothing can be absorbed through the skin.	True	False	Don't know
xii. Workers do not need to wash their hands after applying pesticides	True	False	Don't know

14. Is there anything about health you would like to know more about?

_____

Your contribution is very much appreciated. Thank you for your time.

Encuesta de prevención de enfermedades

Pesticidas y exposición solar

Su nombre _____

1. ¿Cuántos años tiene? _____ años

2. ¿En qué país nació?

Estados Unidos México

Puerto Rico Jamaica

Otro *(Por favor escriba el nombre)* _____

3. ¿Cuantos años fue a la escuela?

_____ años

6. ¿Por cuántos años ha trabajado en la agricultura en los Estados Unidos?
_____ años

7. ¿En qué tipo de cultivos ha trabajado?
(Encierre en un círculo todas las opciones que correspondan.) *Ejemplo: árbol*

i. Tabaco ii. Naranja

iii. Manzana iv. Fresa

v. Otro (*Por favor escriba)* _____

6. Al trabajar en las granjas, ¿qué tipo de trabajo ha hecho?
(Encierre en un círculo
las opciones que correspondan.) Ejemplo: carpintero

Cocinero Roceador de pesticida

Recolector Sembrador

Otros (*Por favor escriba)* _____

Ahora nos gustaría saber lo que piensa y hace respecto a la exposición al sol y a su experiencia en el uso de pesticidas y la seguridad respecto a los pesticidas. Recuerde, los pesticidas son químicos que se usan para eliminar diferentes tipos de pestes e incluyen insecticidas, herbicidas, fungicidas. Los pesticidas pueden venir en forma de gránulos, polvos, líquidos y gases y se pueden aplicar con la mano, con aspersores manuales/de espalda, con tractores y aviones.

Exposición al sol

7a. En el pasado, ¿le enseñaron o aprendió algo respecto a la protección frente a la exposición al sol?

Sí No

7b. ¿Qué le enseñaron? *(Por favor, describa)* _____
_____
_____

Exposición a pesticidas

8. ¿Alguna vez ha usado pesticidas?

Sí No

8a. En el pasado, ¿le enseñaron o aprendió algo respecto a la protección frente a la exposición a pesticidas?

Sí No

8b. ¿Se lo enseñaron en cada granja?

Sí No

8c. ¿Qué le enseñaron específicamente? *(Por favor, describa)*_____
_____
_____

9. Usted **posee** o **tiene acceso** diario:

Ejemplo: ¿beber agua?	***Sí***	*No*
i. Un sombrero que de sombra a su cara, orejas y cuello? 	Sí	No
ii. ¿Gafas de sol? 	Sí	No
iii. ¿Una camisa de manga larga para trabajar? 	Sí	No
iv. ¿Guantes para usar mientras recoge la cosecha? 	Sí	No

10.
Si era possible para usted poseer o tener acceso a materiales para protegerse cuando esta trabajando en los campos—de que frequencia usted usaria los siguentes:

(coloque una X en la casilla correcta)

	Siempre	La mayoría de las veces	Algunas veces	muy pocas veces	Nunca	Se niega a contestar	No sabe
***Ejemplo**: ¿Bebe agua?*		***X***					
¿Se queda en la sombra durante los descansos?							
¿Usa un sombrero que de sombra a su cara, orejas y cuello? 							
¿Usa gafas de sol? 							
¿Usa una camisa de manga larga para trabajar? 							
¿Usa guantes para protegerse mientras recoge la cosecha? 							
¿Con qué frecuencia se cambia la ropa durante los 15 minutos después de terminar de trabajar?							

Las siguentes preguntas son para conocer cuanto usted sabe sobre la exposición al sol y la exposición a los pesticidas. Por favor, contéstelas tan bien como pueda hacerlo.

Nota: la deshidratación es igual a la perdida de mucho agua del cuerpo. = 

Exposición al sol

14. Por favor, conteste las siguientes preguntas como Si, No o No sabe.
Encierre en un círculo *Si*

En un día caluroso o durante mucho ejercicio agotador, es normal perder más de dos litros de agua por hora.	Si	No	No sabe
Si Usted estuviera deshidratado, Tendría sed todo el tiempo? O, en otra forma, cada vez que esta deshidratado, va a tener sed?	Si	No	No sabe
¿Usted cree que sudar, lo cual ayuda a eliminar el calor del cuerpo, es menos efectivo en ambientes húmedos?	Si	No	No sabe
Beber cualquier tipo de líquido le ayudará a prevenir la deshidratación. (café, te, cerveza, agua, soda, gatorade)	Si	No	No sabe
¿Los calambres puede ser consequencia de la deshidratación?	Si	No	No sabe
Beber agua con un poco de sal y azúcar puede aliviar los calambres?	Si	No	No sabe
¿Las camisas de algodón y de manga larga protegen del cansancio por el calor mejor que las camisas de manga corta?	Si	No	No sabe
¿El uso de un sombrero en un día muy asoleado le hará sentirle con más calor?	Si	No	No sabe
¿Los calambres musculares pueden ser causados por el calor y el sudor?	Si	No	No sabe
¿Consumir más sal le hará tener más calambres?	Si	No	No sabe
¿Las nauseas y el dolor de cabeza pueden ser ocasionados por trabajar en el sol durante mucho tiempo?	Si	No	No sabe
¿La ropa de colores claros le ayuda a sentir menos calor que la ropa de colores oscuros?	Si	No	No sabe
Si alguien esta deshidratado, se puede usar licor para rehidratarlo. Una cerveza, por ejemplo.	Si	No	No sabe
El trabajo aumenta la temperatura del cuerpo. ¿Cree que deba descansar si siente demasiado calor?	Si	No	No sabe

Exposición a los pesticidas

15. Por favor, conteste las siguientes preguntas como Si, No o no sabe.
Encierre en un círculo *Si*

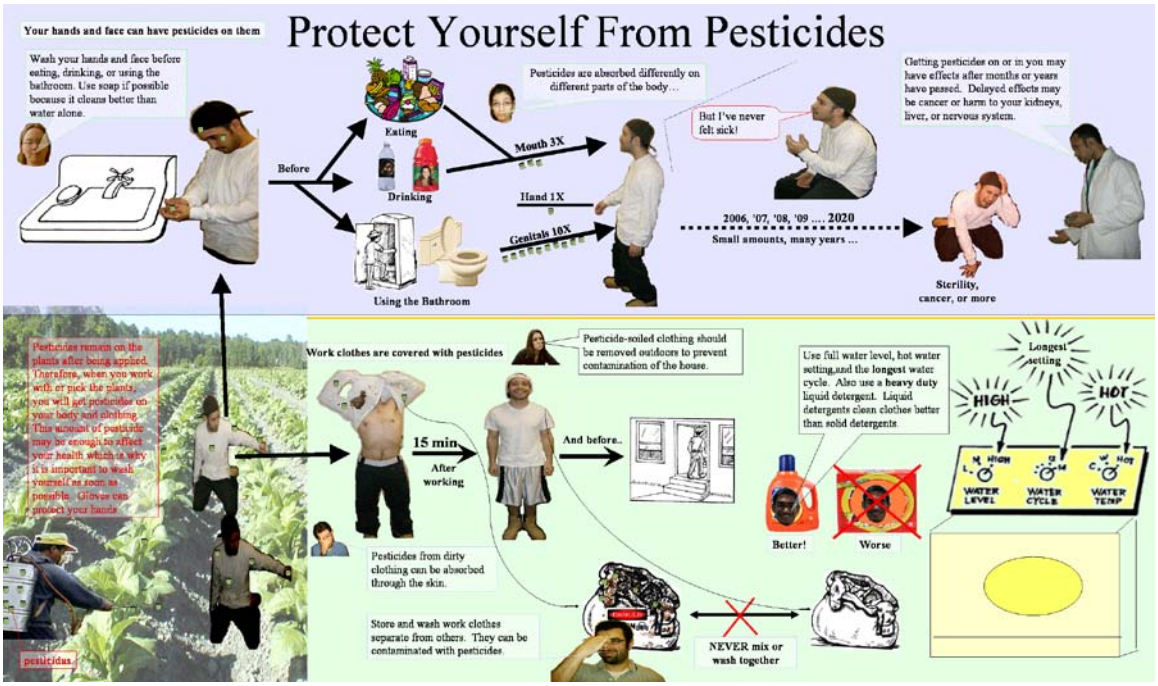
i. Sólo las personas que rocían pesticidas están expuestas a una cantidad de pesticida que son cause daZo. Por eso ellos usan protección y los demás no.	Si	No	No sabe
ii. ¿La ropa contaminada con pesticidas deben ser quitada al aire libre?	Si	No	No sabe
iii. ¿Lavarse las manos antes de comer es importante para prevenir la ingestión de pesticidas?	Si	No	No sabe
iv. ¿Los pesticidas en la boca, ojos o cara pueden ser más malos para su salud que la misma cantidad de pesticidas en sus manos?	Si	No	No sabe
v. Una pequeZa cantidad de pesticida en la ropa puede ser malo para su salud.	Si	No	No sabe
vi. Antes de lavar la ropa contaminada con pesticidas, déjela con el resto de ropa sucia.	Si	No	No sabe
vii. La ropa contaminada con pesticidas debe de lavarse separada de la demás ropa.	Si	No	No sabe
viii. Sólo algunas ropas contaminadas con pesticidas se deberían lavar en una lavador a la vez.	Si	No	No sabe
ix. ¿El lavado en agua fría es el más efectivo al lavar ropa contaminada con pesticidas?	Si	No	No sabe
x. Los detergentes líquidos no remueven la mugre y los pesticidas de la ropa tan bien como lo hacen los detergentes granulados.	Si	No	No sabe
xi. Los pesticidas de la ropa sucia se pueden absorber a través de la piel.	Si	No	No sabe
xii. **No** es necesario lavarse las manos después de aplicar pesticidas.	Si	No	No sabe

14. ¿Hay algo que le gustarPa saber más sobre la salud?

_____

Apreciamos mucho su contribución. Gracias por su tiempo.

Appendix K. Pesticide Protection Poster (Eng/Span)



Appendix I. Heat Stress Protection Posters (Eng/Span)